

BROOKS
HALLO



BOOK NO.

48

ACCESSION

f621.3 J82

174238

NOT TO BE TAKEN FROM THE LIBRARY

FORM NO. 37 2M-5-21



Index to Volume XLVIII

JANUARY TO JUNE

1922



Journal of Electricity
and **Western Industry**

Published by McGraw-Hill Company of California
San Francisco, California

+f621.3
J82 48

174238

AUTHORS' INDEX

	Page		Page		Page
Ashley, Geo. W.	265	Frost, W. L.	407	Moriarty, W. D.	67, 117, 165, 457
Babbitt, E. G.	302	Gibson, Burton Y.	153	Murray, E. R.	*17
Bartlett, John T.	27, 205, 245	Goddard, Charles A.	359	Oehlmann, Hilmer J.	89
Barton, Larry J.	440	Gray, E. C.	147	Page, F. A.	201
Beckman, J. W.	340	Griffith, Franklin T.	152	Parsons, A. T.	155
Bell, George L.	346	Grunsky, C. E.	*348	Phillips, H. P.	*445
Bibbins, T. E.	*307	Hagen, R. M.	106	Pine, P. P.	*113
Bishop, S. W.	163	Henry, H. L.	88	Pope, C. A.	319
Blake, L. K.	113	Herr, E. M.	226	Potbury, Alfred H.	89
Bragg, G. H.	*396, *402	Heston, W. C.	*362	Powell, R. C.	397
Breck, Henry C.	*96	Hopkins, A. C.	281	Putnam, W. R.	151
Brewer, Robert W. A.	48	Huntington, D. L.	151	Rawley, B. E.	9
Britton, Emmet N.	226	Jackson, H. F.	152	Rhona, C. O.	187
Britton, John A.	151	Jahant, Walter V.	378	Roedel, Edwin	*104
Brown, Bruce F.	443	Jaquay, F. E.	378	Rominger, Jos. V.	8
Bump, Milan R.	265	Jorgensen, Lars	341	Russell, William A.	21, 62, 111, 160, 199, 241, 315, 354, 453, 509
Caldwell, O. B.	264	Kalenborn, A. S.	*156	Sibley, Robert	*91, *229, *269, *310, *479
Champreux, A. J.	8	Kennedy, S. M.	151	Sizer, Frank L.	105
Chandler, A. E.	450	Kennedy, T. O.	152	Squires, H. B.	147
Chapin, Carl K.	*149	Kincaid, E. A.	55	Smith, A. D.	279
Chapman, C. K.	*23	King, J. R.	186	Stalder, Walter	*102
Chase, Elmer E.	101	Kramer, Elbert	383	Starr, Rex, C.	*53, 305
Chatfield, Rey E.	459	Krug, Frederick	*64	Stickney, G. H.	*57
Cherry, F. H.	*356	Layng, John F.	441	Stone, John Cushing	*189
Cowles, E. Roy	*414	Lee, Chas. H.	303	Strauch, A.	238
Crawford, William H.	11, 146, 267	Leurey, Louis F.	15, 195, *343, *455, *511	Talbot, Guy W.	152
Criddle, E. B.	*24, 392	Lewis, George E.	441	Tucker, E. H.	51
Crowell, A. C.	302	Lightbody, James	146	Wagener, C. D.	49
Davis, Laurence W.	234	Martin, J. C., Jr.	313	Weir, W. W.	158
Day, A. B.	151	Mason, David T.	*99	Weller, A. I.	441
Delany, C. H.	272	McArthur, Lewis A.	187	West, A. B.	151
Denny, R. C.	406	McFarlane, D. D.	*423	White, W. M.	227
Dolson, F. O.	400	McGregor, A. G.	227	Willis, Bailey	*48
Edgerton, E. O.	351	Mehlhorn, John W.	340	Wishon, A. G.	152
Eliel, Paul	448	Michener, H.	*380	Woodward, F. H.	385
Emerson, R. G.	245, 321, *421	Miller, John R.	264		
Frampton, W. R.	409	Miller, Stephen I.	186, 227		

Index to Volume XLVIII

Illustrated articles are designated by an asterisk (*), editorials by a dagger (†).

	Page		Page		Page
A		Agricultural College Students Apply for		Approval of Columbia Basin Plans Ex-	
A. A. E.—		A. A. E. Charter, Logan, Utah.....	33	pected from Goethals	287
Annual Convention, Salt Lake.....	33	†Agricultural Credits, Stabilizing by Long	436	Architects and Builders Listen to Elec-	
Budget for National Convention, Salt	251	Term Loans		trical Home Story	327
Lake City		*Agricultural Prospects in Western States	96	Arizona—	
Odgen Chapter, Students Apply for	33	Review of—by Henry C. Breck		Bill Asking for Appropriation to	
Charter		Agricultural Rate, New, Southern Sierras	461	Complete Dam Introduced Into	462
Salt Lake Convention	428	Power Co.		Senate	
S. F. Section Appoints Committee to	211	†Airplane Forest Patrol, Discontinuing	45	Industrial Data Only Partial List of	227
Investigate Water and Power Act		*Airplane Forest Patrol Makes Good	157	Installed Capacity	
A. I. E. E.—		Western Record in 1921.....		Armament Stand, Calif. Senator Cen-	70
Denver Holds Meeting	428	Alaska—		sured for	
Portland Meeting	428	Electric Heating Popular, Valdez.....	289	*Artificial Daylighting in Industry and	
Seattle Section Meeting	33	Alaska Mining Development for 1919	6	Commerce, Use of—by G. H. Stick-	57
Utah Chapter Monthly Meeting.....	251	Albers Bros. Milling Co. Reopened,	284	ney	
Am. Soc. C. E. to Hold Autumn Meeting	251	Ogden		Asbestos, California Opportunity for.....	144
in San Francisco.....		Albuquerque, N. M.—		Association of Building and Construction	123
†A. S. M. E. Convention at New York.....	45	City Electric Co. Builds Homes for	248	of Oregon Formed	
A Few Ideals to Shoot At.....	197	Employees		†Association on Associations, The.....	337
†A Few Sidelights on Ontario Rates.....	5	Alternating Currents, Principles of—	427	Association, Contractor-Dealer, What Can	234
Aberdeen, Wash.—		Book Review		be Accomplished Through Education	
Elec. Industry Homebuilding Pro-	123	*Aluminum Cable Steel Reinforced With-	240	—by Laurence W. Davis.....	
gram		stands Storm		Associations, Trade, Informal Ruling on	236
Grays Harbor Ry. & Lt. Co. Devel-	326	American Brass and Anaconda Copper	29	Lawful Activities	
opment		May Consolidate		*At the Source of Wealth in the North-	180
Accomplishments of Cooperation and the	227	American Valuation	167	west—Frontispiece	
Value of Group Consciousness—by		American Valuation Assn. Presents	88	*Attractive Store Displays of B. C. Con-	66
Stephen I. Miller		Views on Proposed Plan—by H. L.	89	tractor Dealers	
Accounting, Uniform, for Municipal and	448	Henry		Auburn, Cal., Forms New Power Co.....	461
Private Utilities—by Paul Eliel.....		American Valuation Plan, Objections	49	Authorities on Hydroelectric Develop-	366
Accounting, Uniform, Idaho Utilities	463	Cited—by Hilmer J. Oehlmann.....		ment Speak, San Francisco.....	
Consider System		American Valuation Plan Urged as Solu-	29	*Auto-Electrolysis as a Possible Cause of	356
Accounting for Municipally Owned Pub-	13	tion of Present Tariff Problems—by		Mechanical Failures—by F. H.	
lic Utilities, Standard		C. D. Wagener		Cherry	
*Accuracy in Power Company Meter Re-	409	Anaconda Copper and American Brass	475	*Auto Stage Transportation Developing,	462
ords—W. R. Frampton		May Consolidate		California	
Action of Shipping Problems Delayed....	144	†Anti-trust Laws, Revamping, Entering	401	Automatic Station Control Meets In-	279
*Activities of the West.....28, 68, 118, 166,		Wedge to		creased Load Demand	
206, 246, 284, 322, 360, 424, 460, 516		*Apparatus, Electrical, in Western Use,	418	*Automatic Substation Equipment Cuts	162
*Adequate Highway Lighting as a Devel-	149	Relay Protection—G. H. Bragg.		Railway Expenses	
oper of Business—by Carl K.		Chairman			
Chapin		Apparatus to Meet Western Needs,	418	B	
Admiralty Logging Co. to Purchase	166	Choice and Maintenance—L. J.		Balboa, Cal.—	
Spruce Holdings		Moore, Chairman		Cal. State Assn. Elec. Contr-Dealers	
Adobe Electrical Home, Los Angeles,	284	Appliance, Electric, The Family Budget	163	Hold Meeting	327
Sold		and the—by S. W. Bishop.....		Batteries Reverse Voltage at Low Tem-	23
Advanced System of First Aid is Life	455	Appliance Campaigns, Opportunity, Ex-	321	peratures	
and Labor Saver		perience and—by R. G. Emerson.....		Baum Frank G.—Application for use of	
Advertising, Cooperative, Northwest	457	†Appliance Sales, The Power Co.'s Obliga-	141	Salt River Waters Causes Controvers-	71
Develops New Aspects—by W. D.		tion in Forwarding		ies	
Moriarty		Appliances, Advertising With Help of	359	Beavers Cause Interruption to Electric	286
†Advertising, Injustices Through Mislead-	3	Church		Service, Hood River, Ore.	
ing		†Appliances, Home, Impartial Research in	182	*Before the Advent of Electricity in the	140
†Advertising, Power Company	375	Appliances, Sale of, Stickers on Monthly	281	West—Frontispiece	
Advertising Appliances with Help of	359	Bills Aid		Bell Loud Speaker, not Maganvox, is	8
Church		Applications for Pipe Line Filed in	287	Used in Transmitting President's	
*Advertising Medium, Selling Electric	283	Wyoming		Speech—by A. J. Champreux	
Light as an		*Applying Electricity Scientifically to	343	Bellingham, Wash.—	
Advertising Plan, The Contractor-Dealer	165	Factory Problems—by Louis F.		N. W. Elec. Service League Meeting	365
and His—by W. D. Moriarty, 67, 117, 165		Leurey		Bend, Ore., Greatest Per Capita Use of	
†Advertising Western Progress	182	Appreciation of "The Dollars and Cents	89	Electricity	250
Advocates Promotion of Fire Alarm and		Standard of Industrial Success"—by			
Signal Systems by Contr-Dealers—by	186	Alfred H. Potbury			
J. R. King					

	Page		Page		Page
Benefitting the Industry, Publicity as a Means of—by R. G. Emerson	245	Business Situation in the Orient—by W. M. White	227	California State Assn. Elec. Contractor-Dealers Regular Meeting, Balboa	327
†Better Business and More Business, the Slogan for 1922	83	Butte, Mont.—		California Utility Equipment Contracts Let	287
Better Conditions Ahead for Calif. Cattle Industry—by R. M. Hagen	106	Contractor-Dealers Hold Annual Convention	289	California Water and Power Act—	
†Beware of Losing the Confidential Contact	45	Mines Start Work	118	See Water and Power Act	
Biltmore Hotel, Los Angeles, Plans Ready	249	To Hold International Copper Exposition	32	Can Wireless Be of Practical Service to Western Business—R. C. Denny, Chairman	406
Bingham, Utah—		†By-Product, Gas, May Save Fruit Industry from Frost	474	†Canada, Handwriting on the Wall in	44
Copper Mines Reopen	322			Canadian Federal Regulation Sought by B. C. Elec. Ry. Co.—by Jas. Lightbody	146
Birthplace of Hydroelectric Generation in the West—Frontispiece	42			Canneries, California, Van Camp Pkg. Co. Purchases	286
Boiler Feed Water, Preheating is Economical Practice—by F. A. Page	201			Canners League of California Urge Establishment of Canning Laboratory at University of California	251
Boiler Service Standby, for Pump—Electric Drive Avoids	455			Canning Industry, Prospects Brighter than Last Year—by Elmer E. Chase	101
Boise, Idaho—				Carbon Black, Utilization of Natural Gas in Making—by L. K. Blake	113
Northwest Convention Plans	428			*Card, Business, Electragist's as a Message Bearer	319
Power Co. to Rebuild Sub-station	209			Carfare, Proposed 3-Cent, Seattle	438
Books and Bulletins	32, 72, 122, 170, 210, 250, 288, 326, 427, 464, 518			Carfare Sustained, Eight Cent, Denver	47
Boulder, Colo.—				Carnegie Institute of Technology Holds Conference on Training of Engineer	289
Elec. Home Establishes Attendance Record	320			Carquinez Straits Span to be Reconstructed	464
Boulder Canyon Survey, California Cities Contribute to	285			Carriers Complete Argument on Freight Rates	119
Brazilian Exposition, U. S. Building Let for	209			Cars, Trackless Trolley, L. A. Railway Investigates	209
British Columbia—				Cattle Industry, California, Better Conditions Ahead—by R. M. Hagen	196
Cooperation Increases Sales	73			*Cedar Poles, Destruction by Termites, California	110
*Contractor-Dealers Attractive Store Displays	66			Cedar River Water Supply Project Contract Let, Seattle	323
Successfully Adopts New Rule of Road	119			Central Station, Electric Heating from Point of View of—by A. Strauch	238
British Columbia City, Low Rates in	263			*Central Station Display, Effective—Great Western Power Co.	243
British Columbia Electric Railway Co. Plans \$10,000,000 Development	428			Central Station Load, Commercial Cooking as a Desirable—by W. W. Weir	158
Seeks Canadian Federal Regulation—by James Lightbody	146			*Central Station Power, Ship Fuel Bill Decreased by—by P. P. Pine	113
British Fuel Situation, Dayton Engineer Gives Personal Ideas on—by Robt. W. A. Brewer	48			Central Station Problems Affect Entire Electrical Industry—by George E. Lewis	440
†Broaden the Cooperative Campaign, One Way to	297			Centralia Electric Men Hosts	288
†Broadening the Cooperative Campaign Idea	259			Cereal Food Plant, Ogden, Utah, Reopened	284
Budget, Family, and the Electric Appliance—by S. W. Bishop	163			*Changes in Cost of Living in the West—Changes in the Mechanism of Distribution Now Under Way—by E. A. Kincaid	55
Budget for Convention of Amer. Assn. of Engineers, Salt Lake	251			†Channels of Distribution for Electric Irons	4
*Builders of the West	10, 50, 90, 148, 188, 228, 256, 304, 342, 379, 442, 478			*Charts, Recording Electrical Sales by—by D. D. McFarlane	423
Adams, Edward F.	266			†Cheapest Power Rates in the U. S.	473
Cheever, Markham	304			Chehalis Electrical Men Hosts	288
Creed, Wigginton E.	90			Chicago Firm to Come West	284
Gates, Charles C.	188			Chile, Siemens-Shuckert Co. Completes Contract with	285
Haines, Ancil F.	148			*Chilean State Railways are Electrified	19
Lewis, Gilbert N.	442			*China is Electrical Machinery Market	352
McDonald, James G.	50			China's Open Door, Placing a Foot in	301
Mills, A. L.	342			Choice and Maintenance of Apparatus to Meet Western Needs—L. J. Moore, Chairman	418
Putman, W. R.	478			Church, Advertising Appliances with Help of	359
Robinson, Henry M.	228			City Electric Co., Albuquerque, Building Residences for its Employees	248
Rolph, George M.	10			City of Los Angeles Salvages Old Pipe by Welding	24
West, Arthur B.	379			City of Tacoma Must Pay Higher Rate for Electricity	121
Building and Construction Assn. of Ore. Formed	123			City of Tacoma Offered Cheap Power	185
Building and Construction Body Formed in Portland	70			*Civic Beauty, Denver Proves Illustration is Asset to	353
Building Boom, Denver	369			†Club Spirit During Past Year	183
Building Costs Compared with 1914 and 1920	339			Coal and Iron Mines, Utah, Inspected by Californians	351
Building Home Possible to Average Man	477			Coal from Utah to California, Freight Rates Reduced	462
Building Permits Increase, Denver	439			Coal Prices, Conference, Washington, D. C.	517
*Building Program, Seattle, Includes Many Schools	463			Coal Problems in Northwest, Mine Bureau Studies	24
Building Record, Northwest Cities, Shows Increase	338			Coal Production in Washington Drops 36 Per Cent in 1921	208
Building Records Reach High Mark, Denver	29			Coal Strike, Second Week	323
Bureau of Foreign and Domestic Commerce for American Manufacturers—by E. G. Babbitt	302			Coal Strike Likely, Pittsburgh-Ohio	167
Bureau of Mines Engineers Examine Deposit of Lignite near Reno	31			*Coal Strike Not Serious in Western States	300
Bureau of Soils Kelp—Potash Plant Sold	463			Coast Cities, Manufacturing Figures on	225
†Bus Transportation, Tide of	182			Coast Jobbers Stage Successful Quarterly Session, Del Monte	171
Bushel Measurement Causes Waste in Grain Trade	456			Colonization Field—Oregon Irrigation Congress to Enter	288
†Business, Safeguarding the Future of	84			†Color Harmony in Home Lighting, Possibilities of	84
*Business Card, Electragist's, a Message Bearer	319			Colorado—	
†Business Cycle Study by Federated American Engineering Societies	337			Decision on Highway Use by Heavy Motors	339
*Business Districts of Western Metropolitan Centers	20			Light Plant Installs New Machinery, Oldest	28
Business Effect of New Tax Law	47				
Business Getting Mediums, Sales Letters Are—by John T. Bartlett	27				
Business Getting Medium, Sales Letter as a—by John T. Bartlett	205				
*Business Outlook in the West for the Coming Year, The—by Robt. Sibley	91				
Business Outlook in Western Market Centers	37, 77, 127, 175, 215, 255, 292, 330, 368, 432, 469, 523				
†Business Paper in the Service of Industry, Functions of a	181				
†Business Recovery, One Way to Retard	250				
Business Research—Its Necessity, Methods and Results—by E. H. Tucker	51				

	Page		Page		Page
Manufacturers Assn. Holds Industrial Exposition	169	*Convention, P. C. E. A., Los Angeles	503	†Crude Petroleum, Getting More Out of	476
Prompt Development Needed for	3	*Contractor-Dealers, Pacific N. W. Has Progressive	358	†Crushing Urge of Commercialism, The	84
Protests Preferred Rates	7	Contractor-Dealers, Promotion of Fire Alarm and Signal Systems Advocated—by J. R. King	186	Cushman Power Site, Tacoma Will Test	161
Sen. Nicholson to Arrange Hearing on Bill for Dept. of Mines	119	*Contractor-Dealers' Convention, Idaho	170	Cutout Prevents Injury to Underground Transformers	317
Urge Prompt Development of	6	Contractor-Dealers Elect Officers, Utah	33	Cyanide Placed on Free List	518
Colorado Engineers Meeting, Boulder	428	*Contractor-Dealer Establishments, Denver	164	Cyanides, Duty on	119
Colorado River—		Contractor-Dealers Meeting, Sacramento, Calif. State Assn. of Elec.	73		
Bills in Congress	425	Contractor-Dealers and Jobbers Meeting, Los Angeles	171	D	
Commission Finishes Western Hearings	324	*Contractor-Dealers Improve Stores, Southern California	244	†Dams to Stop Waste, Flood Control	85
Commission Hearings, Washington, D. C.	361	*Contractor-Dealers of Oregon Hold Convention—by W. C. Heston	362	*Damsites, Relation to Earthquake Faults by Bailey Willis	48
Commission Seeks Solution	286	*Contractor-Dealers Progress During the Year, Western	26	†Danger of Farmer Legislation, The	142
*Controlling the Principal Artery of the Southwest States—by C. E. Grunsky	*348	Contracts for Construction of Brazilian Exposition Building Let	209	†Danger to the Forest Service, A	142
Denver Co. Seeks Permit for Project	463	*Controlling the Principal Artery of the Southwest States—by C. E. Grunsky	348	Data Regarding Gaps Still Existing in Great Interconnected Power System—by Lewis A. McArthur	187
Flood Conditions	438	Controversy, Three-sided, Over Waters of Truckee River	287	Davis, Laurence W. Speaks at Vancouver	289
Floods are Prophesied	376	Convenience Outlet Installation Costs Compared	115	*Daylighting in Industry and Commerce, Use of Artificial—by G. H. Stickney	57
Hoover is Chairman of Commission	30	Convenience Outlets, Wired Furniture Will Aid in Sale—by Rey E. Chatfield	459	Dayton Engineer Gives Personal Ideas on British Fuel Situation—by Robt. W. A. Brewer	48
Meeting, Washington, D. C.	69	Convention, Butte, Montana Contractor-Dealers Hold	289	Deal for Los Angeles Transmission Lines Closed	461
New Hydroelectric Development	118	Convention, Los Angeles, Pacific Coast Electrical Assn.—See Pacific Coast Elec. Assn.		Dealers Should Use Caution in Displaying Electric Heaters	117
Plans Referred to the Senate	226	Convention of International Assn. of Fire Engineers to be held in S. F.	123	Decision Relative to Utilities Given by Wyoming Judge	462
Stations to Study Stream Flow	249	*Convention, Idaho Contractor-Dealers	170	Declares Shippers of Green Tree Fruits Lost Money in 1921—by Geo. W. Ashley	265
Colorado River Question, National Issue	339	Convention, Idaho Organizations Will Hold Joint	73	*Decoration Improves Store, Salt Lake—Denver, Colo.—	203
Colorado River Situation	167	Convention, New Mexico Electrical Interests	211	Building Permits Show Increase	439
Columbia Basin, Report of Gen. Goethals on	376	Convicts on Road Work in Northern California	200	Building Records Reach Record High Mark	29
Columbia Basin Report Filed	360	Cooking, Commercial, as a Desirable Central Station Load—by W. W. Weir	158	Contractor-Dealers Elect Officers	251
Columbia River Channel, Portland Seeks Money to Improve	206	Cooking and Heating, Electricity for—F. H. Woodward, Chairman	386	Cooperative League Holds Successful Theater Party	211
Columbia Basin Plans, Approval Expected from Goethals	287	*Cooperation, Inter-Industry, Keynote of L. A. Convention, P. C. E. A.	503	Eight Cent Carfare Sustained	47
Columbia River Survey by Gen. Goethals	170	Cooperation and the Value of Group Consciousness, Accomplishments of—by Stephen I. Miller	227	Electrical Home Opening Delayed	70
†Combining Public and Private Enterprise	85	Cooperation Increases Sales in British Columbia	73	Electrical Home Ready May 8	364
Comfort of Plant Force Increases Output	511	Cooperation Will Alter Farmer's Attitude Toward Power Companies—by Walter V. Jahant	378	Elec. Home to Open	327
Commerce Department Aids Exporters	22	Cooperative Advertising, Northwest Develops New Aspects—by W. D. Moriarty	457	Electrical Home Sets Record	460
Commercial Cooking as a Desirable Central Station Load—by W. W. Weir	158	Cooperative Campaign, Cal. Electrical, Del Monte Meeting, Jan. 25	73	Electricity on Farm Shown at Stock Show	122
†Commercialism, The Crushing Urge of	84	†Cooperative Campaign, One Way to Broaden	297	Figures Show Growth During 1921	71
Commission, Cal. R. R., Asserts Rights	167	†Cooperative Campaign Idea, Broadening the	259	Foundries Ask 10% Wage Reduction from Board	166
Commission, Utah, Has Control of Municipal Utilities	208	Cooperative Campaign to Sponsor Course in Salesmanship	210	*Holiday Illumination of Civic Center Applauded	70
Commission Grant Licenses, San Joaquin Light & Power Corp.	322	Cooperative League, Denver, Holds Successful Theater Party	211	Home Electric Visited by 36,992 People	515
Commission of Public Docks, Portland, to Begin Construction	322	†Cooperative Marketing Association, California	374	*Home is Model of Household Conveniences	514
Commission Seeks Solution of Colorado Problem	286	†Cooperative Marketing Within the Law	223	*Industrial Show Visited by 75,000	248
†Committee Meetings, The Dual Idea in	143	Cooperative Method Announced, New	6	*Intensified Selling Gets Big Results	457
Committee to Meet with U. S. Shipping Board	118	Cooperative Profit-Making Enterprises, Some Objections to—by Stephen I. Miller	187	League Advisors Listen to Discussion of Trade	123
†Common Sense Attitude Toward Earthquakes	261	†Coordination of Storage Reservoir Facilities	260	Manufacturing Interests Plan Regular Meetings	73
Company Secures Terminal for Its Electric Ferries at San Francisco	288	Coos Bay Improvement	190	Myrtle Hill School Pageant	288
*Comparative Advantages of Unit and Line Drive in Industry—by H. P. Phillips	445	Copper Mines, Utah, Reopen	322	Progressive Contractor-Dealer Establishments	164
†Completing 1100 Miles of Transmission	85	Conner to Los Angeles, Urge \$5 Per Ton Freight Rate	68	*Proves Illumination is Asset to Civic Beauty	353
*Compressed Spruce Products Solve Problem of Transmission	318	Conra Crushing Business in Northwest	210	R. R. Will Build Repair Shops	424
†Condenser Tube Corrosion, Problem of	336	†Corrosion, Condenser Tube, Problem of	336	Record Breaking Building Boom	369
Conditions in Twelfth Federal Reserve District	293, 369, 477	*Cost of Living in the West, Changes in	300	Sales Force Establishes Vacuum Cleaner Record	245
Conditions in Utah Point to Return to Normal	324	Costs, Building, Compared with 1914 and 1920	339	Seeks to Tunnel the Rockies	377
†Confidential Contact, Beware of Losing the	45	*Costs, Reducing, in Underground Construction Work—E. Roy Cowles, Chairman	414	To Have Largest Electric Sign in Mountain District	72
Constitutionality of King Tax Bill Is Attacked	209	Costs Compared, Convenience Outlet Installation	115	Union Pacific R. R. Improvements	208
Construction News and Industrial Developments	38, 78, 128, 176, 216, 266, 295, 333, 371, 433, 470, 524	Costs of Building Home Possible to Average Man	477	Unique Plan for Furnishing Electrical Home	67
Construction Program, Twenty Million, Pacific Gas. & Elec. Co.	224	*Costs of Electric Energy in California Compared with Ontario—by Robt. Sibley	269	*Waffle Eating Contest	115
*Construction Work, Increasing Efficiency of Laborers on—by R. C. Starr	306	†Costs of Government, Reduce or Prepare for Disaster	373	Will Have \$10,000,000 Electric Smelter	68
Consumer Ownership Idea Shows Rapid Growth	331	Course in Salesmanship, Cooperative Campaign to Sponsor	210	Denver Co. Seeks Permit for Project on Colorado River	463
Consumers Charged for Electric Service, How Much—E. B. Criddle, Chairman	392	Court Decides Against L. A. Bond Sale	87	Denver Gas & Elec. Light Co. Promotes Officials	325
Contest Won by Small Margin, San Francisco	171	Court Ruling on Refusal to Sell, U. S. Cramp & Sons Purchase Pelton Water Wheel Co.	250	†Depreciation Rulings of the Power Commission	142
Contests Successful, California Campaign Essay	65	Crater Lake Park Extension Disapproved by Engineers	284	Depression in 1923? Should Pacific Coast Expect	191
Contractor-Dealer Associations—What They Can Accomplish Through Education—by Laurence W. Davis	234	†Crisis in Western Transportation, The	297	Deschutes Irrigation Project is Subject of Protest	122
Contractor-Dealer and His Advertising Plan, The—by W. D. Moriarty	67, 117, 165	Crons for 1921 are Valued at \$167,014,950, Washington	28	*Destruction of Cedar Poles by Termites in California	110
*Contractor-Dealer Sells Fifty Washers in Ten Days	163			Developing the Pacific Coast, Reducing Sales Resistance in—by W. H. Crawford	11
*Contractor-Dealers, Attractive Store Displays, B. C.	66			*Development, New, Where and How Western Power Companies Will Spend \$100,000,000	469-7
*Contractor-Dealers, California, Adopt New Emblem	319			Development of Colorado, Urge Prompt	6
Contractor-Dealers, California, Meet in Sacramento	123			Development Plans Announced by Sespe Light and Power Company	210
Contractor-Dealers, California State Assn. Regular Meeting	327			*Difficulties of Transportation to Mountain Power Projects—by Rex C. Starr	53
Contractor-Dealers, Denver, Elect Officers	261			†Direction Finder, Radio, as an Aid to Navigation	374
Contractor-Dealers, Montana, Hold Annual Convention at Butte	289			†Disabled Veterans, Training Schools for	299
Contractor-Dealers, Oregon, to Hold Convention	171			†Disarmament Conference Promises for the West, What the	43
				†Disarmament, Effect Upon Industry	85

	Page		Page		Page
Family Budget and the Electric Appliance, The—by S. W. Bishop.....	163	†Freight, Why Pay on Water Content of Green Timber?	474	Golden Gate Ferry Co., San Francisco, Makes Final Arrangements.....	288
Far East Offers U. S. Market.....	68	Freight and Express Shipments, Rules for Marking Issued	162	*Gothard Section of Swiss Railways, Electrification of	314
†Farm Situation, Eastern.....	183	*Freight Problems, Transcontinental, vs. the Panama Canal—by John Cushing Stone	189	†Government, Reduce Costs or Prepare for Disaster	373
†Farmer Legislation, Danger of.....	142	Freight Rate on Copper to Los Angeles, Urge \$5 Per Ton	68	*Government Installs Electric Ovens at San Diego Base	287
Farmer's Attitude Toward Power Companies, Cooperation Will Alter—by Walter V. Jahant.....	378	Freight Rates, Carriers Argue for Reduction in	119	Government Ownership of Public Utilities, Report Scores.....	247
Farmers, Utah, Ask Rate Reduction.....	184	Freight Rates, Lower, Will Aid Northwest Industries	516	Government Plans Timber Sale, Grays Harbor District	424
Farmers Will Benefit by Newly Organized Federal Banks.....	516	Freight Rates, Western States to Plead for	71	Governor Signs Bill Authorizing Moffat Tunnel	476
Feasibility of Conducting an Electrical Appliance Store Demonstrated, L. A.	27	†Freight Rates in Lumber Industry, Re-adjustment	436	Grain Trade, Bushel Measurements Causes Waste	456
Feather River Power Development, Lumber Co. Protests.....	120	†Freight Rates in the Green Fruit Industry	181	Grand Central Mine, Utah, Replaces Steam with Electrical Equipment.....	206
Federal Banks, Newly Organized, Benefit Farmers	516	Freight Rates on Coal from Utah to California Reduced	462	Grande Coulee Waterpower Application.....	119
Federal Funds for State Roads, Utah.....	465	Freight Rates on Poles Cut.....	326	Grays Harbor District, Timber Sale.....	424
Federal Highway Appropriation Will Benefit Western States.....	275	Freight Rates Reduced on Elec. Appliances, etc., by S. P. Co.....	69	Grays Harbor Ry. & Lt. Co., Aberdeen, to Develop Hydro-Elec. Power.....	326
Federal Injunctions, Washington, D. C.....	425	Freight Rates to Come Down, Interstate Commerce Commission May Authorize Freight Reductions Benefit Shingle Manufacturers of Pacific Northwest.....	519	Great Northern Ry. Improvements, Washington	327
Federal Power Commission, Washington, D. C.	69	Freight Reductions in Northwest Aid Lumber Manufacturers	284	Great Western Power Co.—Buys Universal Properties.....	248
Federal Power Comm. to Act on Valuation in California.....	119	Fresno, Cal.—Cal. Peach & Fig Growers' Plant Destroyed by Fire.....	325	*Effective Central Station Display.....	243
Federal Reserve District, Twelfth, Conditions	293	†Friendly Word, The Value of a	5	†Green Fruit Industry, Lower Freight Rates in	181
†Federal Reserve System "Passing the Buck" Unfairly	437	*Frontispieces	2, 42, 82, 140, 180	Green Tree Fruit Shippers Lost Money in 1921—by Geo. W. Ashley.....	265
*Federal Road Funds Shared by National Forest States	276	Fruit, Green Tree, Shippers Lost Money in 1921—by Geo. W. Ashley.....	265	Growers Praise War Finance Board.....	300
Federal Telegraph Co. Aided by Radio Corporation	460	Fruit Canning Laboratory Urged for U. C.	251	Guarantee, Misinterpretation Causes Servicing Troubles	25
†Federated American Engineering Societies, Business Cycle Study by.....	337	†Fruit Industry, Gas By-Product May Save from Frost.....	474		
Federated Engineering Societies Report on Shift Workers.....	280	†Fruit Industry, Green, Lower Freight Rates in	181	H	
Federated Engineering Societies Study Reforestation	207	Fuel—California's Prosperity Depends on Future Supplies of—by C. H. Delany.....	272	Halloran, Arthur H., Re-elected President of Pacific Radio Trade Assn., San Francisco	123
Feed Water, Boiler, Preheating Is Economical Practice—by F. A. Page.....	201	*Fuel Bill Decreased by Central Station Power, Ship—by P. P. Pine.....	113	†Handwriting on the Wall in Canada, The	44
Ferries, Electric, San Francisco.....	288	Fuel for Railroads on Pacific Coast, Importance of Oil as—by J. C. Martin, Jr.	313	†Have We Reached the Parting of the Ways?	141
Ferryboats, Elec. Oper., to Be Constructed, S. F.—Oakland	327	Fuel Situation, Dayton Engineer Gives Ideas on British—by Robt. W. A. Brewer	48	Heat, Electric, Increases Output of Low Gravity Oil Wells.....	512
*Fields for Illumination, New, Yosemite Valley	118	†Functions of a Business Paper in the Service of Industry.....	181	Heater, Water, Low Demand High Load Factor Favored in Pacific Northwest—by A. C. Crowell.....	302
*Fifteen Billion Dollar Market for Equipment and Supplies.....	486	Funds Raised for First St. Railway Payment in Seattle.....	207	Heater Display, Montana Power Co. Installs Novel	67
†Fifteen Billion Dollar Market in the West, The	473	Furnaces, Electric, Tested by Japanese Government	428	Heaters Electric, Dealers Should Use Caution in Displaying.....	117
Figures on Manufacturing in Seven Western Cities	225	Furniture, Wired, Will Aid in Sale of Convenience Outlets—by Rey E. Chatfield	459	Heating, Electric, Campaign, Japan.....	289
Figures Show Growth of Denver During 1921	71	Furniture Mfg. City, Portland Held to Be Largest—by Wm. H. Crawford.....	146	Heating, Electric, Popular in Far North.....	289
†Filling up the Valleys with a Domestic Load	298	Fuses, Educate the Public to Change and Save Money on Electric Bill—by John W. Mehlhorn	340	Heating, Increasing Use of Electricity for —F. H. Woodward, Chairman.....	385
Film Used to Spread Information, Southern Sierras Co.....	207	†Futuristic Landscape, Public Sentiment Against	337	Heating, Industrial, Committee.....	383
Finance Board, War, Growers Praise.....	300			Heating, Industrial, Installations Show Satisfactory Results—Elbert Kramer, Chairman	383
Finance Committee of Senate to Complete Alterations to Tariff Bill.....	285	G		*Heating in Peru, Successful Use of Electricity for House—by A. S. Kalenborn	156
Finance Corp., War, Work Outlined by Eugene Meyer	325	†Gambling Has No Place in Engineering.....	223	Hetch Hetchy Bids Called for.....	250
Firm Alarm and Signal System Promotion Advocated by Contractor—Dealers—by J. R. King.....	186	†Gas By-Product May Save Fruit Industry from Frost	474	*Hetch Hetchy Dam Is One-fifth Completed	30
*Fire Alarm System, New Business for the Contractor in—by E. R. Murray.....	17	Gas Facilities, Los Angeles, Must Be Improved	462	†High Tension Insulators, Need for Research	374
Fire Destroys Lighting Exhibit in Los Angeles Building	28	*Gas Storage and Transportation Problem Solved, Los Angeles.....	426	†High Tension Phenomena, New Discoveries	435
First Aid, Advanced System, Is Life and Labor Saver	455	General Electric, Western Factory.....	184	High Voltage Apparatus, Subcommittee.....	380
†Five Cent Raisin Carton in Eastern Centers, The	143	General Electric Co., New Officials.....	462	Highest Head Hydroelectric Power Installation of the World—by A. T. Parsons	155
*Fixtures, Lighting, Merchandising, in Western Factory Branch.....	422	General Goethals Surveys Columbia River Basin	170	Highway Appropriation, Federal, Will Benefit Western States.....	275
Flood Conditions on Lower Colorado River	438	Generating Station, Tacoma Will Build.....	360	Highway Bill Passes, Washington, D. C.	425
†Flood Control Dams to Stop Waste.....	85	Generation, Steam, of Power in the West —R. C. Powell, Chairman.....	397	Highway Deadlock Broken, Washington, D. C.	517
Floods, Utilities Blamed for.....	284	Generator, Electrical Steam, Has Possibilities in the West	279	†Highway Development, Who Should Pay for	374
Floods Are Prophesied on Colorado.....	376	Geographic Distribution of Western Industrial Plants	108	Highway Legislation, Washington, D. C.	285
Food Plant, Cereal, Reopened at Ogden.....	284	†Getting More Out of Crude Petroleum.....	475	*Highway Lighting as a Developer of Business, Adequate—by Carl K. Chapin	149
†For a Better Understanding of Our Every-day Problems	437	Getting Selling Ability from Newspaper Want Ads	513	Highway Program, California, Progressing	461
Foreign and Domestic Commerce Bureau for American Manufacturers—by E. G. Babbitt	302	*Geologist Discusses Relation of Damsites to Earthquake Faults—by Bailey Willis	48	Highway Program, Washington to Spend \$6,550,000 on	246
Foreign Trade, S. F. Takes Steps to Protect	71	Geyser, California, Natural Steam Plant Proposed at the	193	Highway Use by Heavy Motors, Colorado Decision	339
Foreign Trade Conference Held in Pacific Northwest	30	†Gifts, Electrical, Introducing June Bride to	436	Highways Should Be Better Lighted, City Streets and—Geo. T. Bigelow, Chairman	389
*Forerunner of the Electric Pump, The Frontispiece	82	Gila Indian Reservation, Arizona—Appropriation for Dam Asked.....	462	†History for the West—Pacific Coast Electrical Assn. Convention.....	473
*Forest Patrol, Airplane, Makes Good Western Record in 1921.....	157	Goethals, Gen., Report on Columbia Basin	376	*Holiday Illumination of Denver Civic Center Applauded	70
†Forest Patrol, Discontinuing the Airplane	45	Goethals, Geo. W., Surveys Columbia River Basin	170	Home, Costs of Building Possible to Average Man	477
†Forest Products Research, Making Available	5	Goethals Expected to Approve Columbia Basin Plans	287	*Home, Electric, Show Exhibit vs. B. C.	357
Forest Roads' Program for Utah.....	326	Gold and Silver Institute, Washington, D. C.	425	*Home, Electrical, Boulder, Colo., Establishes Attendance Record	320
†Forest Service, A Danger to the.....	142	Gold and Silver Output, U. S.....	69	Home, Electrical, Denver, Ready May 8.....	364
Forest Service Offers for Sale California Timber Tract	71			Home, Electrical, Denver, to Open.....	327
†Forests, Western, Threatened by Eastern Pests	222			Home, Electrician's Share in the Labor Cost of	205
Foundries, Denver, Ask Wage Reduction from Board	166			Home Beautiful Show, San Francisco.....	463
†Four Power Pact Most Important Problem of Western Industry.....	259			*Home Electrical at Spokane Show Proves to Be of Practical Value to Industry.....	116
Freezing Pipes and Mains, Yakima, to Be Remedied by Steam in Reservoirs.....	210				

	Page		Page		Page
†Home Lighting, Possibilities of Color Harmony in.....	84	Industrial Data Contains Only Partial List of Installed Capacity in Arizona—by A. G. McGregor.....	227	J	
*Honduras, Unique Tower Line Construction Adopted in—by Frederick Krug....	64	*Industrial Executive, Western, Problems That Confront—by Robt. Sibley.....	479	Japan—	
Hood River, Ore.—		Industrial Exposition of Colorado-made Goods.....	169	Electrical Utilities, 1921.....	327
Beavers Cause Interruption to Electric Service.....	286	Industrial Fair, Manila, P. I.....	31	Osaka Elec. Lt. Co. Plans Electric Heating Campaign.....	289
Hoover Is Chairman of Colorado River Commission.....	30	Industrial Figures in Feb. 1 Issue, Possible Misunderstanding of—by E. C. Gray.....	147	207 Elec. Engineers Graduated.....	616
Hoquiam, Wash., Elec. Industry Home-building Program.....	123	Industrial Heating Committee.....	383	Westinghouse Announces Big Order from.....	31
Hotel, Biltmore, Los Angeles, Under Construction.....	325	Industrial Heating Installations Show Satisfactory Results—Elbert Kramer, Chairman.....	383	Japanese Diet Passes Import Duty Bill.....	618
*House Heating in Peru, Successful Use of Electricity for—by A. S. Kalenborn.....	156	Industrial Lighting Code Proposed for Washington Factories.....	464	Japanese Government, Mint Tests Electric Furnaces.....	428
Household Appliances, Speeding Up Sale of—by Charles A. Goddard.....	359	Industrial Market for West, Manufacturing Load Shows.....	107	Japanese Railway to Excavate 10-Mile Subway.....	288
*How California Has Outdistanced Ontario in Economic Growth—by Robt. Sibley.....	310	Industrial Plant, Personnel Dept in—by Bruce F. Brown.....	443	Jitney Competition, Spokane Frees Street Cars from.....	476
How Much Should Consumers Be Charged for Electric Service—E. B. Criddle, Chairman.....	392	Industrial Plants, Western, Geographic Distribution of.....	108	Jobber Salesmen, Northwest, Hold Meetings in Seattle.....	289
†Human Nature and Political Oratory.....	284	*Industrial Plants of the West, Power Needs of 6227.....	498	Jobbers, Coast, Stage Successful Session, Del Monte.....	171
Hurley Mfg. Co. to Come West.....	284	Industrial Power, Seattle Makes 25 Per Cent Reduction on Off-Peak.....	360	Jobbers and Contractor-Dealers' Meeting, Los Angeles.....	171
Hydraulic Engineer Sizes Up the Business Situation in the Orient—by W. M. White.....	226	Industrial Problems Discussed by President of California Manufacturers' Association—by John R. Millar.....	264	Joint Meeting, Los Angeles, of Jobbers and Contractor-Dealers.....	171
Hydroelectric, Western, Development Meets Special Problems—F. O. Dolson, Chairman.....	400	†Industrial Prosperity Indicated by Power Sales.....	221	Journal of Electricity and Western Industry—	
*Hydroelectric Commission, Ontario, Plants Damaged.....	460	*Industrial Show, Denver, Visited by 75,000.....	248	Radio Message Heard in Washington, D. C.....	32
Hydroelectric Development in California Told by Four Authorities.....	366	†Industrial Significance of Standardization.....	4	*Journal's Radio Page.....	282
Hydroelectric Development on Colorado Revealed.....	118	Industrial Situation, Seattle, Commission to Investigate.....	324	†June Bride—Introducing Electrical Gifts.....	436
Hydroelectric Generation in the West, The Birthplace of.....	42	Industrial Success, "Dollars and Cents" Standard of—by Louis F. Leurey.....	15	*June Bride Week.....	458
Hydroelectric Plant, Mexico.....	518	†Industries, Western, New Service to.....	375	*June Bride Week Campaign, Radio Wedding Closes.....	518
Hydroelectric Power Installations of the World, Highest Head—by A. T. Parsons.....	155	†Industry, Competing, Supporting with Tax Money.....	335	June Bride Week Furnishes Merchandising Idea.....	459
Hydroelectric Project Announced by Stockton Company.....	209	*Industry, Electrical, and Parades and Festivals.....	204		
Hydroelectric Projects Under Way in 1921 or Scheduled for 1922, Western.....	61	†Industry, Functions of Business Paper in Service of.....	181	K	
Hydroelectric Resources of N. W.—Resolutions Adopted to Encourage.....	324	†Industry, Western, Most Important Problem of.....	259	†Keeping Books in the Stock Industry.....	298
I		Industry Handicapped by Lack of Engineers, Progress of—by Louis F. Leurey.....	195	Kelp-Potash Plant at Summerland, Cal., Sold.....	463
†Ice Dangers, A Rare Opportunity for Study.....	143	†Industry in the West, Locating an Informal Ruling on Lawful Activities of Trade Associations.....	236	Kennedy Co., Colin B. and Wagner Elec. Mfg. Co. Join Forces.....	616
Idaho—		†Injustices Through Misleading Advertising.....	3	Key Route Ferry to Operate Elec. Ferryboats, Oakland.....	327
*Contractor-Dealers' Convention.....	170	*Installation, Factory, Combines Safety with Economy.....	198	*Kilbourne & Clark Mfg. Co. Complete New Factory, Seattle.....	208
Irrigationists Will Form One Large Water District.....	211	Installation, Value of Good Methods of and the Use of Quality Materials—by H. B. Squires.....	147	*Kilo Watt Being Starred in Movie Produced for N. E. L. A.....	239
Mackay Telephone Co. Requests Lower Rates.....	121	Installation Costs Compared, Convenience Outlet.....	115	Kilowatt-hour as Power Measure Readily Visualized.....	64
Mining Co. Closes Placer Deal.....	284	†Insulators, High Tension, Need for Research.....	375	King Tax Bill Constitutionality Attacked.....	209
Power Co. Will Spend \$200,000.....	169	Insure Elec. Machinery, N. Y. Co. Will.....	118	Kings River Filings, L. A. Refuses to Give Up.....	71
R. R. Co. to Spend \$3,000,000.....	460	*Intensified Selling Gets Big Results in Denver.....	457		
Ruling Affects Bills of Political Subdivisions.....	123	Interconnected Power System, Data Regarding Gaps Existing—by Lewis A. McArthur.....	187	L	
Utilities Consider System of Uniform Accounting.....	463	Interconnected Power System, Tacoma and Seattle.....	463	*Labor Cost, Material Handling Machinery Cuts.....	466
Idaho Land & Power Company to Install Two Generating Units, Southern.....	29	*Inter-Industry Cooperation Keynote of Los Angeles Convention, P. C. E. A.....	503	Labor Cost of a Home, Electrician's Share in the.....	205
Idaho Organizations Will Hold Joint Convention.....	73	*Intermountain Electrical Men Hold First Session—by M. L. Cummings, Jr.....	363	†Labor Problem, West Is Solving the Labor Relations, Western, on the Way to Sound Solution—by George L. Bell.....	336
Idaho Power Companies Give Rebates to Farmers.....	31	Intermountain Power Company Bought by Washington Water Power Co.....	519	Labor Saver, Advanced System of First Aid.....	455
Idaho Power Co. to Rebuild Large Boise Substation.....	209	Interesting Sidelights on the Activities of Public Utilities in Spain—by Emmet N. Britton.....	226	Labor Used in Building Western Power Plants.....	439
Idaho Power Co. Will Spend \$200,000.....	169	†Internal Revenue, Western Office for.....	299	*Laborers on Construction Work, Increasing Efficiency of—by R. C. Starr.....	305
Ideals to Shoot at, A Few.....	197	International Assn. of Fire Engineers to Hold Convention in San Francisco.....	123	Lack of Engineers, Progress of Industry Handicapped by—by Louis F. Leurey.....	196
Illuminate 12-Mile Highway in Southern California.....	288	Interruption to Electric Service Caused by Beavers, Hood River, Ore.....	286	Lake Washington Bridge Proposal Rejected.....	249
*Illumination, Denver, Proves Asset to Civic Beauty.....	353	†Introducing the June Bride to Electrical Gifts.....	436	*Lamps, Merchandising \$30,000 Worth.....	26
Illumination, Undiscovered Markets for Electricity in—W. L. Frost, Chairman.....	407	Iron, Swedish, as Model for Western Development, Need for Study of—by J. W. Beckman.....	340	Land Commission Rules Against Utah Power and Light Co.....	70
*Illumination, Yosemite Valley.....	118	Iron and Steel Center, West Has Facilities for—by Larry J. Barton.....	440	Land Owners, California, Fight for Water Rights.....	168
Illumination Essential for Economical Production.....	317	†Iron Industry, Western, Why Not Develop.....	335	†Landscape, Futuristic, Public Sentiment Against.....	337
*Illumination Necessary for Efficiency.....	456	†Irons, Channels of Distribution for Electric.....	4	Large Electrical Trade with Orient.....	7
*Illumination of Denver Civic Center Applauded.....	70	Irrigation Congress, Oregon, Discusses Reclamation.....	72	Large Utah Mine Replaces Steam with Electrical Equipment.....	206
†Impartial Research in Home Appliances.....	182	Irrigation Congress, Oregon, to Enter Colonization Field.....	288	†Laws, Anti-trust, Entering Wedge to Revamping.....	476
Importance of Oil as Fuel for Railroads on the Pacific Coast—by J. C. Martin, Jr.....	313	Irrigation Project, Deschutes, Is Subject of Protest.....	122	Leaders of Sugar Industry Hold Convention at Salt Lake.....	519
Important Savings in Mineral Industry.....	263	*Irrigation Project, Exchequer Damsite, Merced River.....	326	League to Fight Cal. Water and Power Act.....	121
†Improvement in Radio Broadcasting.....	336	†Irrigation Projects on West Coast of Mexico.....	222	†Legislation, Danger of Farmer.....	142
Improvement of Coos Bay, Ore.....	120	Irrigationists, Idaho, Will Form One Large Water District.....	211	†Legislation, Revamping to Fit Changed Conditions.....	222
*Improving the Mountain Playgrounds.....	12			Letters, Sales, as a Business Getting Medium—by John T. Bartlett.....	205
†Inaccuracies of Western Origin, Eastern.....	44			Letters to the Editor.....	8, 48, 88, 146, 186, 226, 264, 302, 340, 378, 440
*Increasing the Efficiency of Laborers on Construction Work—by R. C. Starr.....	305			Lewis River Site, Northwestern Elec. Co. Files on.....	122
Increasing Efficiency of the Purchasing Department—by A. D. Smith.....	279			†Licensing of Engineers, Regarding.....	85
*Increasing Production in Industry.....	23, 64, 113, 162, 201, 279, 317, 356			Licensing of Members of Profession, Utah Engineers Ask.....	33
Increasing Use of Electricity for Cooking and Heating—F. H. Woodward, Chairman.....	385			*Lighting, Highway, as a Developer of Business—by Carl K. Chapin.....	149
Industrial, Western Plants, Distribution and Power Usage of 6227.....	500			†Lighting, Possibilities of Color Harmony in Home.....	84
Industrial Conference L. A. Convention Feature.....	465			Lighting Code, Industrial, Proposed for Washington Factories.....	464
				Lighting Code, Industrial, Utah Manufacturers Oppose New.....	210

	Page		Page		Page
New Mining Co. in Utah.....	206	†One Way to Retard Business Recovery....	260	Twenty Million Construction Pro-	224
New Officials Will Head General Elec-		*Ontario, Cal., Before the Advent of		gram	
tric Co. Activities	462	Electricity in the West—Frontispiece....	140	To Sell Power to Redding.....	170
New Power Co. Formed at Auburn, Cal.	461	Ontario (Cal.) Power Co. Installs Auto		Will Reconstruct Carquinez Straits	
New Process for Utilization of Sawdust		Station Control	279	Span	464
as a Fuel	64	Ontario, Canada—		Pacific Mfg. Co.-Pacific Porcelain Co.,	
New Radio Company Formed, Salt Lake		A Few Sidelights on Rates.....	5	Richmond, Cal., Combine	517
City	424	*California Has Outdistanced in		*Pacific Northwest Has Progressive Con-	
*New Record of the Western Power In-		Growth, How—by Robt. Sibley.....	310	tractor-Dealers	358
dustry, A—Frontispiece	2	*California Should Profit by Experi-		Pacific Ports, Shipping Pool Plan for.....	46
New Rubber Manufacturing Plant for		ence of—by Robt. Sibley	229	*Pacific Power and Light Co. Stages Road	
Pacific Northwest	68	*Cost of Power Compared with Cali-		Show in Northwest	426
†New Service to Western Industries.....	375	fornia—by Robert Sibley	269	Pacific Power & Light Co.'s Stock Cam-	
New Transmission Line Dedicated by		Facts to Meet the Argument.....	224	paign	286
Washington Water Power Co.....	461	*Plants of Hydroelectric Commission		Pacific States Electric Co., Seattle, En-	
†New Vision of the Pacific Coast Electrical		Damaged	460	tertains Seattle Elec. Association.....	251
Association	373	To Investigate Commission	262	Pacific Tel. & Tel. Co.—Extensions in	
New York Company Will Insure Elec-		Ontario Hydro-Electric Commission—		San Francisco	169
trical Machinery	118	Report Scores Government Owner-		Pageant Perfected by Myrtle Hill School	
*Newbery Electric Corp. Window Display		ship of Utilities	247	Pupils, Denver	288
Newspaper Want Ads, Getting Selling		†Open-Door Policy, The	221	*Panama Canal, Transcontinental Freight	
Ability from	513	Opening of Denver Electrical Home De-		Problem vs.—by John Cushing Stone....	189
Niagara Falls Power Co. Orders 65,000-		layed 30 Days	70	*Parades and Festivals and Electrical In-	
kvs. Units	519	Opportunity, Experience and Appliance		dustry	204
Niagara of Mexico, First Large Hydro-		Campaigns—by R. G. Emerson	321	Park City Mining & Smelting Co. Or-	
electric Plant in Mexico.....	518	†Oratory, Political, Human Nature and...	435	ganized in Utah	206
†No Voltage Release for the Pumping		Ordinance to Regulate Electrical Retail		†Parting of the Ways? Have We Reached	
Plant, A	223	Dealers, Portland	28	the	141
Northern Commercial Co. of Alaska		Oregon—		Park Utah Mine Equipped for Electrical	
Moves from S. F. to Seattle	169	*Contractor-Dealers Hold Convention		Operation	464
Northern Railroads Expand.....	246	—by W. C. Heston.....	362	Pasadena, Cal.—	
Northwest Cities Building Record Shows		Irrigation Congress to Enter Colon-		Electric Club Organized	365
Increase	338	ization Field	288	Pasadena Will Purchase Power for An-	
Northwest Develops New Aspects of		Limits Picketing by Strikers to Si-		other Year	464
Cooperative Advertising—by W. D.		lent Patrol	519	Passenger Conference, Transpacific.....	377
Moriarty	457	Mountain States Power Co. Buys		†Passing of Cheap Power, The.....	83
Northwest Electric Light & Power Con-		Utility Properties	286	†Passing of Wireless Furor.....	474
vention	428	New Line Extension Rules in Effect...	249	†"Passing the Buck" Unfairly in the Fed-	
Northwest Electrical Service League		Public Service Commissioners Re-		eral Reserve System	437
Meeting at Bellingham.....	365	called	517	Patent Legislation—First Senate Hear-	
*Northwest Firm Solves Problem of Trans-		Question of the Hour—Taxes.....	263	ing, Washington, D. C.....	323
mission	318	Reclamation of 35,000 Acres.....	118	Patent Medicines Invade Field of Elec-	
Northwest Industries, Lower Freight		Oregon Body Scores Tax-Free Securities..	87	trical Industry	243
Rates Will Aid	516	Oregon Charcoal-Iron Co. Erects Fur-		Patent Office Relief	119
Northwest Jobber Salesmen Hold Meet-		nace	324	Payroll Dollar, Oregon Organization	
ings in Seattle.....	289	Oregon Contractor-Dealers to Hold Con-		Traces	464
Northwest League Emphasizes Home		vention	171	Peak of Public Utility Rates Definitely	
Electrification	365	Oregon Iron & Steel Co. Finishes Plant..	326	Passed	29
Northwest, Lumber Production Normal...		Oregon Irrigation Congress Discusses		Pelton Water Wheel Co. Purchased by	
438		Reclamation	72	Philadelphia Concern	250
*Northwest, Pacific, Has Progressive		Oregon-Kalama Lumber Co. to Erect		People's Economy League Will Fight	
Contractor-Dealers	358	Sawmill	361	Water Power Act	166
Northwest Plant Progressing.....	460	Oregon Organization Traces Path of Pay-			
Northwest Railway to Install Radio Sets		roll Dollar	464	*Personals	34, 74, 124,
*Northwest, Source of Wealth in the...	180	Orient—		172, 212, 252, 290, 328, 366, 430, 466,	520
Northwestern Co. Files on Lewis River		Electric Projects Planned.....	185	Aaron, Phil., 173; Abrams, N., 212,	
Site	122	Hydraulic Engineer Sizes Up Busi-		431; Adams, Prof. Duff A., 520; Addi-	
Northwestern Electric Co. to Survey		ness Situation	226	son, Dr. T. A. 290, 430, 521; *Agutter,	
Power Possibilities	424	Large Electrical Trade with.....	7	J. J., 172; Ahata, Genichiro, 366; Ald-	
Notes of a Western Engineer on Con-		*Oven, Electric, Shows Economies in S. F.		rich, C. R., 521; *Alexander, I. W.,	
ditions in Europe from an American		Factory	114	212; Alexander, Wallace, 75; Alvord,	
Viewpoint—by Lars Jorgensen	341	*Ovens, Electric, Installed at San Diego		Raymond, 290, 431; Amweg, Col. Freder-	
		Base	287	rick J., 124; Anderton, J. H., 173;	
		Over 13,000,000 Hp. in Western Filings		Argabrite, Harry H., 35; Armstrong,	
				G. E., 431; Atkins, George E., 520;	
				Aylesworth, M. H., 329, 521.	
				Babcock, David T., 431; Babcock, F.	
				H., 291; Bacon, E. P., 430; Bain, H.	
				Foster, 520; Baker, John A., 521;	
				Ballard, R. H., 466; *Balzari, R. A.,	
				290; Bargion, H. A., 173; Barker, W.	
				J., 35; Barnhill, J. D., 75; Barry, J.	
				G., 125; *Barry, J. R., 521; Batcheller,	
				Willis T., 213; Baum, Frank G., 467;	
				Beach, Maj. Gen. Lansing H., 517;	
				Beardsley, C. S., 172; Beebe, Howard	
				F., 521; *Bell, George L., 366; Bellows,	
				E. C., 172; *Bent, D. E., 430; Bentley,	
				R. L., 34; Bibbins, T. E., 75; *Birkett,	
				M. W., 431; Bishop, S. W., 124, 367;	
				Bixler, George W., 290, 328; Black, J.	
				B., 74, *520; Black, Maj. Gen. Wm.	
				Murray, 75; Blauvelt, Major Louis D.,	
				521; Board, V. L., *431, 521; Boise,	
				Whitney L., 213; Bonner, Frank, 366;	
				Bossemeyer, C. O., 366; Bostwick,	
				Harry, 173; Bowler, E. L., 213; Boy-	
				kin, R. M., 172, 466; Boylan, D. W.,	
				75; Boyle, J. C., 124; Brackenridge, W.	
				A., 466; Brain, Vivian, 430; Brainerd,	
				W. F., 172; Braymer, D. H., 366;	
				Brewer, Robert W. A., 74; Britton,	
				John A., 172, 212, 328, 431, 466, 467;	
				Brokaw, J. B., 124; Brown, G. F.,	
				291; Brown, W. F., 521; Browne, E.	
				E., 212; Brundige, Harley W., 172;	
				Budd, Britton L., 366; Burchard, Har-	
				old W., 35; Burger, Theodore E., 34;	
				Butler, Dean G. M., 172; Butterworth,	
				C. W., 430; Byllesbv. Colonel H. M.,	
				252; Byrne, Harry, 173.	
				Caldwell, R. E., 252; Calloway, A. J.,	
				35; Capron, Capt. A. J., 74; Cargo, L.	
				M., 35; Case, S. L., 252; Caunt, Joseph,	
				520; Chandler, Harry, 252; Chappelle,	
				M. C., 430; Chatfield, R. E., 213, 328;	
				Childs, A. W., 74, 431. *467; Clark,	
				Capt. Addison N., 253; Clarke, J. C.,	
				75; Clayton, William, 366; Code, E. S.,	
				520; Coldwell, O. B., 125; Colwell, J.	
				L., 173, 253; *Coman, Wilbur E., 74;	
				Cooper, John J., 252; Copley, A. W.,	

O

P

Oakland, Cal.—	
Elec. Oper. Ferryboats for Key Route	327
Oakland Harbor Expenditures Recom-	
mended to Congress	168
Obituary—	
Barker, William	213
Doud, Chester C.....	35
Felthousen, John H.....	291
Fouch, William O.....	75
Henderson, George E.....	291
Klein, John M.....	125
Powell, G. Harold.....	253
Schneider, Charles F.....	125
Scovil, Lyman A.....	253
†Obligation in Forwarding Appliance	
Sales, The Power Company's.....	141
Obvious Objections to American Valua-	
tion Plan Cited by Importer—H. J.	
Oehlmann	88
Officials, New, Will Head General Elec-	
tric Co.	462
Officials Appointed, Pac. Gas & Elec.....	122
Ogden, Utah—	
Alber Bros. Cereal Food Plant Re-	
opened	284
Oil as Fuel for Railroads on the Pacific	
Coast, Importance of—by J. C. Mar-	
tin, Jr.	313
*Oil Industry, California, During Past	
Year—by Walter Stalder.....	102
Oil Production in California in 1921	
Leads Nation	72
Oil Reserve Estimate, U. S.....	145
Oil Situation Outlined, California.....	46
Oil Wells, Low Gravity, Electric Heat	
Increases Output	512
Oldest Colorado Light Plant Installs	
New Machinery	28
Olympia, Wash.—	
Resolutions Adopted to Encourage	
Dev. Hydro-Elec. Resources	324
State Mine Inspector Figures Show	
Coal Production Drop.....	208
Olympic Peninsula Spruce Holdings, To	
Purchase	166
†One Way to Broaden the Cooperative	
Campaign	297

Page		Page
291;	Courtright, H. H., 124; Creed, Wigginton, E., 173, 466; Criddle, E. B., 74; Crooks, N. R., 467; Crozier, H. W., 367; Cullinan, Eustace, 125.	
	Daly, Harry, 431; Damon, George A., 367; Daugherty, E. M., 172; Davidson, J. C., 35, 290, 467; Davies, J. Vipond, 34; Davis, F. R., 252, 328; Davis, Lawrence W., 172, 431; Dayley, H. H., 467; Deming, W. M., 430; Dewes, Herbert, 520; Dignan, John, 467; Dinwoody, Ralph J., 329; Douden, Paul A., 521; Downey, Archibald S., 367; Dumbleton, A. G., 253; Durand, W. F., 75.	
	*Eardley, Edward H., 35; Ebaugh, John H., 34; Eberle, George J., 74; Eddy, Richard T., 467; Edgerton, Edwin O., 367; Ellery, N. B., 466; Emerson, R. G., 263; Emmons, G. E., 125, 173; English, J. C., 172; Evans, George W., 212.	
	Fagan, Frank D., 520; Feiker, F. M., 173; Fellows, Ernest R., 34; Fellows, F. A., 124; Fenwick, J. F., 431; Ferrier, A. L., 466; Fisher, Evan, 213; Fisher, Harry, Jr., 213; Fisher, R. E., 252, 430, 466; Fleishacker, Herbert, 75; Foch, Marshal Ferdinand, 34; Foley, J. J., 366; Fox, C. A., 520; *Fredericks, Capt. John D., 212; French, T. W., 125; Fritz, Harry, 521; Frost, W. L., "Jack," 431; *521; Frueaif, Frank W., 329; Fullerton, J. B., 172, 430.	
	Gallison, Norman S., 431; Gauntlett, C. G., 75; Gavin, M. J., 74; Gear, Harry B., 366; Gentry, R. G., 35, 466; George, H. C., 74; Gibson, Burton Y., 35; Glass, Louis, 74; *Goddard, P. L., 329; Goodnow, Frank E., 366; Goethals, Major General Geo. W., 74, 328; Goldhammer, M. H., 467; Goodwin, W. L., 212; Graham, N. A., 431; Gray, N. W., 431; Greenawalt, J. F., 521; Greenfield, W. S., 431; Greenwood, Heman, 173; Gregory, S. B., 431; Griffith, Franklin T., 35, 466; Gross, Charles F., 329; Grunsky, C. E., 290; *Grunsky, Clotilde, 173; Gundlach, H. J., 366; Gute, H. J., 329.	
	Haines, Henry R., 213; Hall, C. B., 431; Hall, E. L., 291; Halloran, Arthur, 521; Hamilton, G. A., 430; Hancock, J. W., 35; Hanscom, W. W., 35; Harnischfeger, Henry, 253; *Harper, H. L., 172; Harper, H. L., 430, 431; Harrington, John J., 124; Harrington, John L., 367; Harris, Perry L., 34; Haskin, J. N., 213; Hawkes, H. D., 124; Headrick, E. C., 253, 430; Heilbron, Carl H., 253; Heintz, Carl M., 35, 252; Heise, Carl, 430; Hemmen, George, 35; Henderson, F. S., 75, 521; Henley, Lloyd, 74; Herr, Edwin M., 291; Hess, Seymour, I., 125; Hibbard, H. Alex., 75; Hillis, C. C., 431; Hoadley, George L., 34; Hoar, F. Emerson, 328; Holloway, A. E., 74, 125; Hoover, Herbert C., 34, 466; *Hopkins, H. C., 125; Horne-Payne, John, 520; Horne-Payne, R. M., 520; Huber, W. L., 290; Hughes, B. S., 366; Hughes, John T., 253; Hull, Robert H., 34; Humphries, C., 125; Hunting, J. R., 430; Hurley, E. N., 328.	
	Ingalls, C. E., 34; Irions, D. G., 328; Irvin, A. M., 431; Iwadare, Kunihiko, 366.	
	*Jackson, Col. A. M., 520; Jackson, H. F., 74; Jacobs, C. C., 74; Jacobs, Joseph, 291; Jefferson, H. F., 35; *Jewett, Dr. F. B., 75; Jewett, Frank B., 329; Johnson, F. E., 75, 212; Johnson, Harley, 366; Johnson, J., 521; Jones, C. H., 366; *Jones, H. H., 74; Jones, J. P., 431; Jorgensen, Lars, 212; Joslin, H. A., 172; *Joy, Al. C., 367.	
	Kahn, J. A., 35; Kassler, E. S., 74; Kearney, James R., 173; Kegan, J. G., 430; *Keeler, Clarence, 329; Kempston, Arthur, 252; Kendall, J. L., 252; Kennedy, Clyde C., 291; Kennedy, S. M., 431; Kennedy, T. O., 34, 124; Kidd, George, 172; Kilburn, E. D., 172; Kimball, Dexter S., 75; Kingsbury, K. R., 34; Kinney, G. I., 34; *Kirk, G. B., 521; Kirtland, A. F., 329; Klaber, L. M., 329; Kline, A. L., 431; Kline, P. D., 213; Kluegel, Major Harry, 74; Knight, E. L., 172; Kofoid, C. A., 367; Kuhl, Max J., 366.	
	*Laing, Percy S., 35; Lane, H. S., 366; Larson, Robert W., 172; Larue, E. C., 367; Laufenburg, W. J., 521; Lecklider, I. H., 74; Lee, Charles H., 74, 124; LeSage, Frank, 172; Leurey, Louis F., 420, 467; Lewis, George, 124, 173, 328, 430; Lincoln, Irving B., 253; Listenwaller, C. E., 367; Loewenthal, 213, 329, 521; Lorentz, Prof. H.	
	A., 74; Lowe, George, 366; Lynch, Robt. Newton, 75, 431; Lyon, Dorsey A., 517.	
	MacIntyre, L. S., 520; Mackell, O. L., 213; *MacMullen, T. D., 467; Mannell, Stuart, 213, 328; Martin, Carl O., 35; *Martin, W. E., 430; Mason, David P., 253; Masson, R. S., 521; Mattis, George, 367; McArthur, L. A., 253; McBryde, Warren, 367; McCammon, F. F., 213, 253, 467; McClellan, William, 291; McClure, D. C., 124, 430; McCoy, A. E., 172; McGovern, H. L., 290; McGrath, W. H., 125; McKee, Paul B., 213, 367; McPherson, J. C., 74; Mead, Dr. Elwood, 212; *Merrill, O. C., 34; Merwin, L. T., 35, 213, 252; Metz, Herbert, 431; Meyer, Eugene, 329; Millar, John R., 328; Miller, H. D., 173; Miller, John B., 367, 466; Miller, K. B., 253; Miller, Preston S., 328; Miller, Robert, 35; Miller, Stephen I., Jr., 253; Millikan, Dr. R. A., 74, 173; Mills, James Hamilton, 290; Moriarty, W. D., 253; Muhlfield, George O., 124, 520; Muir, J. Malcolm, 212; Munroe, Roy G., 430; Murray, S. W., 430.	
	Naphtaly, S. L., 75, 124; Neiman, William, 34; Newbert, Lee H., 173, 291, 431; Newcombe, W. R., 366; Newlin, M. E., 74; *Nicholson, George F., 35; Noetzi, Fred A., 212; Norcross, J. B., 253.	
	Oakes, Roscoe, 431; Ohshima, Mitsuchi, 252; Olsen, Norman, 466; Onken, W. H., 521; Ostoff, Otto E., 34.	
	Pabst, Hilmar, 291; Parry, P. M., 75; Patten, Byron T., 466; Peirson, Charles H., 431; Pfau, Arnold, 366; Phelps, W. H., 74; Platt, F. C., 74; *Piggott, William, 124; Plumb, H. T., 329, 466; Pohlman, James H., 125; Poindexter, A. M., 34; Pope, C. A., 328; *Portman, Edward C., Jr., 252; Potts, James, 430; Price, H. B., 125; Purdon, Arthur, 34; Putnam, W. R., 75, 329.	
	Quinan, George, 172, 329.	
	Randall, George R., 290; Randall, Harry, 467; Rathbun, W. S., 34; Read, Ben F., 74; Reese, Al., 431; Reid, Frederick H., 290; Reynolds, D. L., 74; Rickard, T. A., 290; Rider, Clark, 467; Robinson, Harrison S., 328; Robinson, Lloyd N., 367; Roller, F. W., 124; Rooker, George N., 173; Rosenberg, A. H., 466; Rowe, Arthur E., 366; Rowley, B. E., 35; Rutherford, H. A., 290; Ryan, Harris J., 467; Ryan, W. D'Arcy, 430, 521.	
	Saurman, Atlee B., 125; Schoolfield, H. H., 253; Schuchardt, R. F., 366; *Scott, John D., 291; Sechrist, Albert, 124; Semrad, C. A., 35, 521; Senior, J. F., 35; Shannon, W. D., 521; *Shaw, Henry M., 75; *Shepard, E. R., 467; Shepard, W. M., 212, 328; Shibusawa, Viscount Eiichi, 75; Shreve, E. O., 173, 431; Sibley, Robert, 75, 173, 212, 367, 431, 467; Sinclair, S. L., 367; Skeels, Fred, 430; Small, Charles H., 430; Smith, Addison N., 467; Smith, Arlington M., 213; Smith, D. L., 366; *Smith, Frank W., 520-1; Smith, Richard E., 431; Smith, W. C., 521; *Sorensen, Prof. Royal W., 328; Spreckels, Claus, 366; Sproule, William, 125; Spurr, Josiah E., 290; Stannard, Clare N., 74, 253, 366, 521; Starr, Rex C., 125; Sterne, William C., 291, 430, 466, 521; Stevens, H. R., 173; Stone, C. W., 291; Stone, P. C., 253; Strandborg, W. P., 466; Strong, Ronald T., 252; Sturgeon, D. D., 466.	
	Tachikawa, R., 430; Tachikawa, Y., 430; Talbot, Guy W., 35, 253, 466; *Talmage, Charles H., 291; Taylor, Samuel H., 173, 291; Teilman, I., 466; Thebo, F. M., 430; Thirwall, J. C., 253; Thomas, Prof. Carl, 520; Thomas, C. C., 329; Thompson, J. C., 124; Thompson, J. S., 213; Thorne, W. E., 329; Titus, C. L., 430; Tolman, Richard C., 517; Traxler, H. H., 467; Tucker, L. W., 366; Tudor, L. S., 213; Turner, Harry W., 75, 173, 521.	
	Vance, W. H., 125; Van Dyk, John, 253; Van Kuran, K. E., 173, 252, 328, 430; Van Law, Durbin, 252; Venable, Frank, 34; Vincent, W. G., 328.	
	Waddell, Dr. J. A. L., 252; Wallis, E. A., 75; Walls, R. B., 172, 253; *Waterhouse, Frank, 290; Wattis, E. O., 431; West, A. B., 173, 367; West, E. A., 521; White, H. E., 172; White, William M., 74; Whiteside, W. H., 291; Whitney, Dr. W. R., 467; *Wiggin, Charles, 213; Williams, C. A., 328; Williams, R. D., 172; Wishon, A. Emory, 34, 430, 431; Wittemore, W. F.,	
	520; Wolf, Guy C., 467; Woodbridge, J. E., 328; Woolley, A. R., 35; Woolley, Ralph R., 74; Worth, Roy, 173; Wrenn, J. W., 328; Wurfel, Walter C., 290, 329.	
	Young, Garnett, 329.	
	Zook, F. K., 290.	
	Personnel Dept. in Industrial Plant, Duties—by Bruce F. Brown..... 443	
	*Peru, Successful Use of Electricity for House Heating in—by A. S. Kalenborn 156	
	†Perversion of Logic, A..... 298	
	†Pest, Eastern, Western Forests Threatened by..... 222	
	†Petroleum, Crude, Getting More Out of..... 475	
	Philadelphia Concern Purchases Pelton Water Wheel Co..... 250	
	Picketing in Oregon by Strikers Limited to Silent Patrol..... 519	
	Pipe Line, Seattle Will Call for Bids..... 206	
	Pit River Tunnel of P. G. & E. Opened New Year's Eve..... 72	
	Placing a Foot in China's Open Door..... 301	
	Plans for Intensive Electric Heating Campaign, Japan..... 289	
	Plans for 1925 Portland Exposition..... 145	
	Plans Progressing for Northwest Convention, Boise..... 428	
	Plans Ready for New Los Angeles Hotel 249	
	*Plants of Ontario Hydroelectric Commission Seriously Damaged..... 460	
	*Play, Electrical, Efficacy Is Demonstrated—by R. G. Emerson..... 421	
	*Playgrounds, Improving the Mountain..... 12	
	Pole Line Construction to Be Investigated in California..... 28	
	Pole Lines, Electric, California Commission to Inspect..... 464	
	*Poles, Cedar, Destroyed by Termites, California..... 110	
	Poles and Piling, Freight Rate Cut..... 326	
	†Policy, Open-Door..... 221	
	Political Subdivisions, Idaho Ruling Affects Bills of..... 123	
	Port of Portland, Dredging Records Broken..... 519	
	Port of Portland Purchases Swan Island, 120	
	Port Terminal for San Francisco Bay..... 28	
	*Porterville Electric Co. Booth..... 321	
	Portland, Ore.—	
	A. I. E. E. and N. E. L. A. Meeting 428	
	Assn. of Bldg. & Cons. Formed..... 123	
	Building and Construction Body Formed..... 70	
	Chamber of Commerce Endorses Vancouver Barracks Plan..... 465	
	City Attorney Gives Opinion on OH Wires..... 246	
	Commission of Public Docks to Begin Construction..... 322	
	Electrical Interests Stage Range Campaign..... 31	
	Held to Be Largest Furniture Mfg. City—by Wm. H. Crawford..... 146	
	Industries Growing..... 68	
	Northwestern Electric to Survey..... 424	
	Ordinance to Regulate Electric Retail Dealers..... 28	
	Oregon Iron & Steel Co. Finishes Plant..... 326	
	Pacific Power & Light Co.'s Stock Campaign..... 286	
	Plans for 1925 Exposition..... 145	
	Seeks Money to Improve Columbia River Channel..... 206	
	To Encourage State Development..... 477	
	To Have Additional Terminal Facilities..... 72	
	Portland Vegetable Oil Mills Co.'s Copra Crushing Business..... 210	
	Possible Misunderstanding of Industrial Figures in Feb. 1 Issue—by E. C. Gray..... 147	
	†Possibilities of Color Harmony in Home Lighting..... 84	
	Potash Industry, Utah, Needs Protective Tariff..... 322	
	Pottery and Porcelain Plants Combine, Richmond, Cal..... 517	
	Power, Industrial, Seattle Makes Reduction on Off-Peak..... 360	
	Power, Off-Peak, Offered at Decreased Rates, Seattle..... 249	
	†Power, The Passing of Cheap..... 83	
	†Power Commission, Depreciation Rulings of the..... 142	
	Power Companies, Farmers' Attitude Toward—Cooperation Will Alter—by Walter V. Jahant..... 378	
	*Power Companies, Western, Will Spend \$100,000,000 a Year, Where and How, 496-7	
	Power Companies, Western, Push Electric Range Campaigns..... 192	
	Power Companies Give Rebates to Farmers, Idaho..... 31	
	Power Co., Boise, to Rebuild Substation..... 209	
	Power Co., California, to Spend \$22,500,000 So. Cal. Edison Co..... 169	
	Power Co., Idaho, Will Spend \$200,000..... 169	
	Power Co., Montana, Sets Merchandising Record..... 243	

	Page		Page		Page
Power Company, Utah, Seeks Permit for Large Development	360	Public Relationship Program—Employee Important Unit—by A. O. Weller	441	Range Campaign, Portland Electrical Interests Stage	31
†Power Company Advertising	375	†Public Sentiment Against Futuristic Landscape	337	Range Campaigns, Electric, Western Power Companies Push	192
Power Co. Formed at Auburn, Cal.	461	Public Service Commissioners of Oregon Recalled	517	*Range Sales, Electric, Stimulated as Result of Demonstrations, Seattle	513
Power Company Installs Novel Heater Display, Montana	67	Public Utilities, Decision Given by Wyoming Judge	462	Ranges, Electric, Sales Promotion vs. "Merchandising" of—by Burton Y. Gibson	153
*Power Company Meter Records, Accuracy in—W. R. Frampton, Chairman	409	Public Utilities, Idaho, Consider System of Uniform Accounting	463	†Rapid Rise of Radio Telephone	261
Power Company Rates Reduced, California	427	Public Utilities, Report Scores Government Ownership of	247	†Rare Opportunity for Study of Ice Dangers, A	143
Power Co. to Extend Lines, Cal.-Ore.	120	Public Utilities in Spain, Interesting Sidelights on—by Emmet N. Britton	226	Rate for Electricity Higher in Tacoma	121
Power Company to Survey Possibilities, Northwestern Electric	424	Public Utilities Commission, Utah, Put System of A/cs Into Effect	119	Rate Increase, 16% Granted Telluride Power Co.	69
†Power Company's Obligation in Forwarding Appliance Sales, The	141	Public Utility Rates, Peak Definitely Passed	29	Rate Increase Granted Dixie Power Co.	121
†Power Factor Control Has Widespread Interest	143	Publicity as a Means of Benefiting the Industry—by R. G. Emerson	245	Rate Reduction Asked by Utah Farmers	184
*Power Industry, New Record of Western—Frontispiece	2	Puget Sound Power & Light Co. Notes to Be Withdrawn from Market	72	Rates, Colorado Protests Preferred	7
Power Lines, Seattle and Tacoma, Interconnection Recommended	324	†Pumping Plant, No Voltage Release for Pupils of Myrtle Hill School, Denver, Perfect Pageant	223	Rates, Mackay Telephone Co. Requests Lower	121
Power Measure Readily Visualized, Kilowatt-hour as	64	Purchasing Department, Increasing Efficiency of—by A. D. Smith	279	Rates, Power Company, Reduced by R. R. Commission	427
*Power Needs of 6227 Major Industrial Plants of the West	498			Rates, Railroad, Hearing in Washington	167
Power Plant Finished, Ore. Iron & Steel Co.	326			†Readjustment of Freight Rates in the Lumber Industry	436
Power Plants, Western, Labor Used	439			†Recent A. S. M. E. Convention at New York	46
Power Project for San Diego	424			†Recent A. S. M. E. Convention at New York	45
*Power Projects, Difficulties of Transportation to Mountain—by Rex E. Starr	53			Reclamation in Central Oregon	118
Power Projects Planned for the West	495			Recommends Wide Publicity Be Given Plans of Western Power Companies—by C. O. Rhona	187
†Power Rates, Cheapest, in U. S.	473			*Recording Electrical Sales by Means of Charts—D. D. McFarlane	423
†Power Sales, Industrial Prosperity Indicated by	221			*Records of the West—From 10,000-220,000 Volts	59
Power System, Interconnected, Data Regarding Gaps Existing in—by Lewis A. McArthur	187			Redding, Cal.—P. G. & E. Improving Water Supply of	31
Power System, Interconnected, Tacoma and Seattle	463			Redding Cal., Sold Power by P. G. & E.	170
Power Usage and Distribution of 6227 Western Industrial Plants	500			†Reduce Costs of Government or Prepare for Disaster	373
Practical Electrical Engineering—Book Review	326			Reducing Sales Resistance in Developing the Pacific Coast—by Wm. H. Crawford	11
Preheating Boiler Feed Water Is Economical Practice—by F. A. Page	201			Reduction in Freight Rates on Elec. Appliances, etc., by S. P. Co.	69
Preparations for Los Angeles Electric Convention Near Completion	365			Reduction of Minimum Wage in California	338
Preservative, Timber, Use in Mines Is Economical	202			Reforestation Studied by Federated Engineering Societies	207
President of Cal. Manufacturers' Assn. Discusses Industrial Problems—by John R. Millar	264			†Regarding Power Company Advertising	375
Priest Rapids Dam, Tacoma, Foundation Examined	363			†Regarding the Licensing of Engineers	85
Principles of Alternating Currents, Book Review	427			Relation of West to World Affairs	338
†Problem of Condenser Tube Corrosion	336			*Relay Protection for Electrical Apparatus in Western Use—G. H. Bragg, Chairman	402
†Problems of Western Industry, Most Important	259			Repair Dept., Unique Display Calls Attention to—by J. T. Bartlett	245
Problems in Steam Generation of Power in West—R. C. Powell, Chairman	397			Repair Shops, Railroad, in Denver	424
†Problems of Production in the Mining Industry	437			Report of Gen. Goethals on the Columbia Basin	376
*Problems That Confront Western Industrial Executive—by Robt. Sibley	479			Report Progress on Skagit River Power House Plans	286
Production, Economical, Illumination Essential for	317			Report Scores Government Ownership of Utilities, N. E. L. A. Makes Public	247
†Production in Mining Industry, Problems Progress of Industry Handicapped by Lack of Engineers—by Louis F. Leurey	195			†Research, Making Available Forest Products	5
*Progressive Denver Contractor-Dealer Establishments	164			†Research, Need for, in High Tension Insulators	375
Profit-Making Enterprises, Cooperative, Some Objections to So-Called—by Stephen I. Miller	187			†Research in Home Appliances, Impartial	182
Projects, Power, Planned for the West	495			†Reservoir Facilities, Storage, Coordination on	260
†Prompt Development Needed for the Colorado	3			Resolutions Adopted to Encourage Development of Hydroelec. Resources in N. W.	324
*Proper Illumination Necessary for Efficiency	456			Restaurant, Elec., Dedicated in S. F.	123
Properties of Universal Electric Co. Operated Jointly	288			*Restaurant, Electrified, San Francisco Has	159
*Prospects for 1922 Indicate Improvement in Lumber Market—by David T. Mason	99			†Re-vamping Legislation to Fit Changed Conditions	222
Prospects of Canning Industry Are Brighter Than Last Year—by Elmer E. Chase	101			*Review of the Agricultural Prospects in Western States—by Henry C. Breck	96
Prosperity, California's, Depends on Future Supplies of Fuel—by C. H. Delany	272			*Review of the California Oil Industry During Past Year—by Walter Stalder	102
†Prosperity, Industrial, Indicated by Power Sales	221			Rice Industry, Western, Stabilizing the	301
Protecting Mine Trolley Wires to Prevent Accidents	23			Rights of Power or Irrigation Interests Questioned	210
*Protection, Relay, for Electrical Apparatus in Western Use—G. H. Bragg, Chairman	402			Riverside, Cal.—Southern Sierras Co. Uses Film to Spread Information	207
Protective Relays—Book Review	250			Road, New Rule Adopted by B. C. El. Ry.	119
*Providing for Accuracy in Power Company Meter Records—W. R. Frampton, Chairman	409			Road Appropriations Reported, Washington, D. C.	323
Provision for Comfort of Plant Force Increases Output	511			Road Construction Program to Begin, Utah	120
Provo, Utah—Electrical Home Is Dedicated	248			*Road Funds, Federal, Shared by National Forest States	276
†Public and Private Enterprise, Combining	85			Road Show in Northwest Staged by Pacific Power & Light Co.	426
†Public Relations in the Lumber Industry	336			*Rocky Mountain Electrical Cooperative League Conference—by M. L. Cummings, Jr.	363
				Rubber Manufacturing Plant for Pacific Northwest, New	68
				Rules for Good Window Display, Primary	203
				Rules for Marking Freight and Express Shipments Issued	162
				Ruling, Idaho, Affects Bills of Political Subdivisions	123
				†Rulings of the Power Commission, Depreciation	142

	Page		Page		Page
Rupert, Idaho, Reduces Salary of Elec. Dept. Manager	121	Wages of Metal Workers Cut.....	325	*Selling Electric Light as an Advertising Medium	283
S		Welding Society Perfects Branch.....	123	*Semi-annual Convention of Idaho Contractor-Dealers	170
S. P. Co. Announces Cut in Freight Rate on Poles	326	Wins Attendance Contest by Small Margin	171	Senator Rominger Comments on Features of Cal. Water and Power Act—by Jos. V. Rominger	8
Sacramento, Cal.—		San Francisco Bay, Port Terminal for.....	28	†Service of Industry, Functions of a Business Paper in the	181
Cal. Contractor-Dealers Meet.....	123	San Francisco Bay—Shipyards Launch 190,000 Tons of Ships.....	29	Servicing Troubles, Misinterpretation of Guarantee Causes	25
State Dept. of Public Works, Division of Water Rights, Locates in.....	207	San Francisco Development Assn. Holds Expositions	325	Sespe Light and Power Co. Announces Development Plans	210
†Safeguarding the Future of Private Business	84	*S. F. Electrical Development League—Plays Host at Christmas Party	33	Set of Primary Rules for Good Window Display	203
Safety Orders, California, Near Completion	289	San Francisco Firm Offers to Buy Muscle Shoals Project	32	Shift, Eight-Hour vs. Twelve-Hour.....	280
Safety Orders, Cal. Electrical, Near Completion	168	S. F. League Censures California Senator for Armament Stand	70	Shingle Manufacturers of Pacific Northwest Benefit by Freight Reductions.....	519
Sale of Timber Terms Announced by Officials, Quinalt, Wash.	120	San Francisco Steel Co. Branch in Seattle	424	Shingle Manufacturers Ask High Protective Tariff	29
*Sales, Electric Range, Stimulated as Result of Demonstrations, Seattle.....	513	San Joaquin Light & Power Corp.—Granted License to Develop.....	322	*Ship Fuel Bill Decreased by Central Station Power—by P. P. Pine.....	113
*Sales, Electrical, Recording by Means of Charts—by D. D. McFarlane	423	Midway Plant to Be Enlarged.....	206	Shipments, Freight and Express, Rules for Marking Issued	162
*Sales Force Establishes Vacuum Cleaner Record, Denver	245	R. R. Commission Reduces Rates.....	427	Shipping Board Hulls Rejected for Lake Washington Bridge	249
Sales Letter as a Business Getting Medium, The—by John T. Bartlett.....	205	Radio Tests	426	Shipping Board's Vessels Sold, Seattle.....	326
Sales Letters Are Real Business Getting Mediums—by John T. Bartlett.....	27	Stockholders Increase	331	Shipping Combine Approved	118
Sales Promotion vs. "Merchandising" of Electric Ranges—by Burton Y. Gibson.....	153	Santa Monica Boulevard Illuminated.....	288	Shipping Combine Meet Set for Jan. 19 in San Francisco	68
Salesman, Retail	277	Sawdust as a Fuel, New Process for Utilization of	64	Shipping Pool Plan for Pacific Ports.....	46
Salesman, Silent, Your Show Window A—by C. A. Pope.....	319	Scappoose, Ore.—		Shipping Problem, Subsidy Only Solution	439
Salesman's Attitude, Questionnaires Aid Company to Learn	25	Oregon Charcoal-Iron Co. Erects Furnace	324	Shipping Problems Delayed, Action of.....	144
Salesmanship, Cooperative Campaign to Sponsor Course in	210	†Schools, Training, for Disabled Veterans	299	Shipyards Gets First Contract in Year, Los Angeles	463
Salesmanship, Self-Improvement in.....	277	†Scientific Advances, Interesting New.....	84	Shipyards on S. F. Bay Launch 190,000 Tons of Ships in 1921.....	29
Salesmanship, Self-Improvement in—by William A. Russell	509	Seattle, Wash.—		Shoshone Hydroelec. Plant Transmission Lines	28
21, 62, 111, 160, 199, 241, 315, 354, 453, (See Self-Improvement in Salesmanship)		Arranges with Tacoma for Interconnected Power System.....	463	Should California Reject the Principle of Utility Regulation?—by E. O. Edgerton	351
Salt Lake City—		*Bldg. Program Includes Many Schools City Council to Build Street Cars.....	249	Should the Pacific Coast Expect a Severe Depression in 1923?	191
A. A. E. Budget for Convention.....	251	Company Completes New Factory—Kilbourne Clark	208	*Show Exhibit vs. Real Electric Home.....	357
A. A. E. Convention Plans.....	428	Commission to Investigate Industrial Situation	324	Show Window, A 24-Hour Silent Salesman—by C. A. Pope.....	319
A. I. E. E. Monthly Meeting.....	251	*Electric Range Sales Stimulated as Result of Demonstrations	513	Sign, Denver to Have Largest in Mountain District	72
Commercial Club Prepares Booklet of Agricultural Resources	327	Electrical Assn. Entertains Laurence Davis	251	Simple Cutout Prevents Injury to Underground Transformers	317
*Electrification Improves Stores with Decoration	203	Engineers' Club Addressed by J. W. Miller	33	Six Years' Experience with Convicts on Road Work in Northern California.....	200
Electrical Home Ready June 15.....	427	Engineers Move Into New Clubrooms	120	Skagit River Offices Move, Seattle.....	248
Electrical Party Hold "49" Party.....	519	First Radio Show.....	360	Skagit River Power House Plans, Progress	286
Engineers Organize Employment Bureau	211	First Radio Show on Pacific Coast.....	517	†Slogan for 1922, More Business and Better Business	83
Leaders of Sugar Industry Hold Convention	519	Funds Raised for First Street Railway Payment	207	Small Lighting Plants Popular Abroad.....	278
Meteorologist Compiles Figures.....	326	Great Northern Ry. Improvements.....	327	Smelter, Denver Will Have \$10,000,000 Electric	68
New Radio Company Formed.....	424	Hits Snag in Utility Control.....	86	Society for Electrical Development, N. Y., Committee Cooperating with Fire Departments	72
Potash Industry Needs Protective Tariff	322	*Kilbourne & Clark Co. Completes New Factory	208	*Sodium Formed in Sea Water, Metallic—by Edwin Roedel	104
Seeks Sites for Reservoirs.....	30	Lake Washington Bridge Proposal Rejected	249	Some Important Recent Developments in Western Water Law—by A. E. Chandler	450
Utah Conditions Return to Normal.....	324	Lets Contract for Cedar River Water Supply Project	323	Some Objections to the So-called Co-operative Profit-Making Enterprises—by Stephen I. Miller	186
*Salt Lake Store Uses Wheel of Fortune in Window Display	27	Makes 25% Reduction on Off-Peak Industrial Power	360	Some Undiscovered Markets for Electricity in Illumination—W. L. Frost, Chairman	407
Salt Lake Jobber Holds That Recovery from Depression Depends on Individual—by B. E. Rawley.....	8	M. R. Smith Co. Purchases Timber.....	323	Some Western Hydroelectric Projects Under Way in 1921 or Definitely Scheduled for 1922	61
Salt River, Controversies Over Use of Waters of	71	Municipal Lighting Dept. Must Obtain Elec. Contr. License.....	465	*Source of Wealth in the Northwest, At the	180
*Salvage	40, 80, 130, 178, 218, 258	Northern Commercial Co. Moves to Northwest Jobber Salesmen Hold Meetings	289	*Southern California Contractor-Dealers Improve Stores	244
Salvage Eliminates Waste	511	Offers Off-Peak Power at Decreased Rates	249	Southern California Edison Co.—Asks for Rate Reductions.....	30
San Diego, Cal.—		Pacific States Electric Entertains.....	251	Consumer Records Transferred to L. A. Bureau of Power and Light.....	322
*Government Installs Electric Ovens at Base	287	Plans to Become Wool Center of West	122	*Dog Team	166
Power Project	424	Radio Show	326	Lets Contract for Equipment.....	287
United Fuel & Power Co. to Sell Its System	365	S. F. Steel Co. Establishes Branch.....	424	L. A. Buys Distribution System.....	250
San Francisco, Cal.—		Skagit River Project Offices Move.....	248	Power Permits Issued, Washington, D. C.	361
Am. Soc. C. E. to Hold Autumn Meeting	251	*Telephone Co. Completes New Building	246	R. R. Commission Reduces Rates.....	427
Authorities on Hydroelectric Development Speak	365	Three-Cent Carfare	438	Stock Selling Activities	331
Awards Contracts for Moccasin Creek Plants	427	Timber Tract Changes Hands.....	322	To Spend \$22,500,000	169
Calls for Bids on Hetch Hetchy.....	250	U. S. Wooden Vessels Sold.....	326	To Start Work at Alhambra	70
Elec. League Condemns Water and Power Act	425	Wash. Assn. for Building and Construction Formed	211	Southern California Illuminates 12-Mile Highway	288
Cyrus Peirce & Co. Installs Radiophones	325	Will Call for Bids for \$2,000,000 Pipe Line	206	Southern Idaho Land & Power Company to Install Two Generating Units.....	29
Electric Oven Shows Economies in Factory	114	Seattle and Tacoma City Power Lines Interconnection Recommended	324	Southern Sierras Company Uses Film to Spread Information	207
Engineers Increase in Number.....	169	Seattle Hotel, Valdez, Alaska, Entirely Heated by Electricity	289	Southern Sierras Power Co. Sets New Agricultural Rate	461
Golden Gate Ferry Secures Terminal.....	288	Securities, Oregon Body Scores Tax-Free Securities, Tax-Free, Seek Constitutional Amendment Against	326	*Southwest States, Controlling Principal Artery of—by C. E. Grunsky.....	348
*Has Completely Electrified Restaurant	159	Seek Constitutional Amendment Against Tax-Free Securities	326	Speeding Up Sales of Household Appliances—by Chas. A. Goddard.....	359
Home Beautiful Show in June.....	463	Seimens-Shuckert Co. Completes Contract with Chilean Government.....	285	†Spending the Money Where It Will Help	261
International Assn. of Fire Engineers to Hold 1922 Convention.....	123	Self-Cooled Transformers Can Be Operated Under Emergencies	201		
League Dedicates First Elec. Restaurant	123	Self-Improvement in Salesmanship—by Wm. A. Russell	21, 62, 111, 160, 199, 241, 315, 354, 453, 509		
Manufacturing Survey	184	Self Improvement in Salesmanship—Buyer of the Goods.....	354, 453, 509		
Radio Concern Expands	516	Goods Offered for Sale.....	199, 241, 315		
Rawhide Center of Pacific Coast.....	247	Retail Salesman	277		
Shipping Combine Meet, Jan. 19.....	68	Salesman Himself	62, 111, 160		
Takes Steps to Protect Foreign Trade	71	Introduction	21		
Telephone Extensions During 1922.....	169	*Selling, Intensified, Gets Big Results in Denver	457		
Universal Electric Co. Properties to Be Operated Jointly	288	Selling Ability from Newspaper Want Ads.	513		
Wages of Foundry Employees Cut.....	71				

	Page		Page		Page
Federal Funds for State Roads.....	465	Washington, D. C.—		*Waterwheel Runner, Expansion of, and	
Grand Central Mine Installs Elec-		Events of Interest to Western Men..		Coupling Electrically for Fitting on	
trical Equipment.....	206	69, 119, 167, 207, 285, 323, 361, 425, 517		Shaft—by G. H. Bragg.....	396
Has Immense Subterranean Water		Washington, D. C. Events—		Weather Bureau, Salt Lake, Completes	
Supply.....	169	American Valuation.....	167	Figures.....	326
Leads in Electricity.....	28	Application Covering Grande Coulee		*Wedding, Radio, Closes June Bride Week	
Manufacturers Oppose New Indus-		Waterpower.....	117	Welding, Los Angeles Salvages Old Pipe	
trial Lighting Code.....	210	Carriers' Arguments on Freight Rates	119	by.....	24
National Forest Roads Expenditures	326	Coal Strike.....	323	*Welding Prevents Tieup in California	
Park City Mining & Smelting Co.		Coal Strike Likely.....	167	Refinery, Electric—by C. K. Chapman..	23
Organized.....	206	Colorado River Bills.....	425	*Welding Saves Traction Company Time	
Rate Reduction Asked by Farmers.....	184	Colorado River Commission Hearings	361	and Money.....	202
Supreme Court Upholds Utilities		Colorado River Hearings.....	167	Welding Society Perfects S. F. Branch..	123
Commission.....	31	Colorado River Meeting.....	69	*West, Business Outlook for Coming Year	
System of Accounts for Pub. Utili-		Duty on Cyanides.....	119	in the—by Robt. Sibley.....	91
ties Put Into Effect.....	119	Dye Probe Begins.....	207	West, Manufacturing Load Shows Indus-	
To Begin Road Construction.....	120	Federal Injunctions.....	425	trial Market.....	107
Utilities Commission Grants Rate		Federal Power Commission.....	69	West, Power Projects Planned.....	495
Increase to Dixie Power Co.....	121	Federal Power Commission Executive		West and Its Relation to World Affairs,	
Water Power Filings on Rivers.....	185	Session February 20.....	207	The.....	338
Utah Construction Co. Stockholders Ap-		Federal Power Commission to Act on		West Exceeds Nation in Water Power	
prove of Bond Issue.....	246	Valuation in California.....	119	Resources.....	208
Utah Copper Mines Reopen, Bingham..	322	Finance Committee of Senate to		*West Harvests Returns from Electrical	
Utah Light and Traction Company Be-		Complete Alterations of Tariff Bill	285	Home Campaign.....	194
gins Spring Repair Work.....	465	Freight Rates to Come Down.....	285	West Has Ample Facilities for Becoming	
Utah Mining Districts, Wage Cuts An-		Gold and Silver Institute.....	425	Iron and Steel Center—by Larry J.	
nounced in Many.....	70	Gold and Silver Output.....	69	Barton.....	440
Utah Potash Industry Needs Protective		Highway Bill Passes.....	425	†West Has Outgrown Main Street, The.....	3
Tariff.....	322	Highway Legislation.....	285	†West Is Solving the Labor Problem, The	
Utah Power & Light Co.—		Metric System.....	69	West Coast Neglecting Southern Trade..	47
Land Commission Rules Against.....	70	Mining Law Revision.....	425	Western Comments on Current Events..	
Stock Sale.....	461	Muscle Shoals.....	119	.....6, 46, 86,	
Supreme Court Overrules Special		Muscle Shoals Controversy.....	207	144, 184, 224, 262, 300, 338, 376, 438,	476
Contract Appeal.....	426	Muscle Shoals Project.....	167	*Western Contractor - Dealers Progress	
Utah Power Company Seeks Permit for		Patent Legislation.....	323	During the Year.....	26
Large Development.....	360	Patent Office Relief.....	119	*Western Dealer, Jobber and Agent.....	
Utilities Blamed for Floods.....	284	Power Permits Issued.....	361	.....25, 65, 115,	
Utilities Commission Grants Rate In-		Proposed Revisions of Mining Laws..	119	163, 203, 243, 281, 319, 357, 421, 457,	513
crease, Utah.....	121	Radio Telephone Control.....	285	Western Engineer on Conditions in Eu-	
Utilities Commission, Utah Supreme		Railroad Rates.....	167	rope from an American Viewpoint—by	
Court Upholds.....	31	Railroad Rates.....	323	Lars Jorgensen.....	341
Utility Control, Seattle Hits Snag in..	86	Road Appropriations.....	323	*Western Factory Branch Applies Modern	
Utility Initiative Acts to Be on Cal.		Trade Associations.....	285	Merchandising to Fixtures.....	422
Ballot.....	71	Water Power Census.....	69	Western Factory for General Electric..	184
Utility Regulation, Should California Re-		Washington Association for Building and		Western Filings, Over 13,000,000 Hp. in..	7
ject Principle of—by E. O. Edgerton..	351	Construction Formed, Seattle.....	211	†Western Forests Threatened by Eastern	
Utility's Public Relationship Program—		Washington Co. Will Build \$250,000		Pest.....	222
Employe Important Unit—by A. O.		Transmission Line.....	168	Western Hydroelectric Development Meets	
Weller.....	441	Washington Crons for 1921 Are Valued		Special Problems—F. O. Dolson, Chair-	
Utilization of Natural Gas in Making		at \$157,014.950.....	28	man.....	400
Carbon Black—by L. K. Blake.....	113	Washington Factories, Industrial Light-		Western Hydroelectric Projects Under	
		ing Code Proposed.....	464	Way in 1921 or Scheduled for 1922.....	61
		Washington State Chamber of Commerce		*Western Idea, Eastern Editor Gives New	
		Adopts Resolutions to Develop Hydro-		Interpretation.....	65
		electric Resources in Northwest.....	324	*Western Industrial Executive, Problems	
		Washington State Timber Sales Reported		That Confront—by Robt. Sibley.....	479
		Washington to Spend \$6,550,000 on High-		Western Industrial Plants, Distribution	
		way Program.....	246	and Power Usage of 6227.....	500
		Washington Water Power Co. Buys Inter-		Western Industrial Plants, Geographic	
		mountain Power Company.....	519	Distribution of.....	108
		Washington Water Power Co. Dedicates		†Western Industries, New Service to.....	375
		New Transmission Line.....	461	†Western Industry, Most Important Prob-	
		Washington Water Power Co. Will Build		lem.....	259
		\$950,000 Transmission Line.....	168	†Western Iron Industry, Why Not Develop	
		Washington Water Power Plant Progress-		ing.....	335
		ing.....	118	Western Labor Relations on the Way to	
		Waste, Salvage Eliminates.....	511	Sound Solution—by George L. Bell.....	346
		*Waste in Industry, Eliminating the.....	420, 455, 511	*Western Metropolitan Centers, Business	
				Districts of.....	20
		Water and Power Act—		*Western Mining Operations Are Definite-	
		†A Perversion of Logic.....	298	ly on the Upgrade—by Frank L. Sizer..	105
		A. A. E. Appoints Committee to		†Western Office for Internal Revenue..	299
		Investigate, San Francisco.....	211	Western Pipe & Steel Co. Branch, Seattle	
		*California Should Profit by the Expe-		Western Power Companies, Recommends	
		rience of Ontario—by Robt.		Wide Publicity for—by C. O. Rhona..	187
		Sibley.....	229	Western Power Companies Plan for the	
		Commented on by Senator Rominger,		Coming Year, What.....	151
		California.....	8	Western Power Companies Push Electric	
		*Costs of Electric Energy in Cali-		Range Campaign.....	192
		fornia Compared with Ontario—by		*Western Power Companies Will Spend	
		Robert Sibley.....	269	\$100,000,000 a Year, Where and How.....	496-7
		Facts to Meet the Ontario Argument		*Western Power Industry, New Record of	
		*How California Has Outdistanced		—Frontispiece.....	2
		Ontario in Economic Growth—by		†Western Progress, Advertising.....	182
		Robert Sibley.....	310	*Western Record in 1921, Airplane Forest	
		League to Fight.....	121	Patrol Makes Good.....	157
		People's Economy League Will Fight		Western Rice Industry, Stabilizing the..	301
		Report Scores Government Ownership		Western States, Federal Highway Appro-	
		of Utilities.....	247	priation Will Benefit.....	275
		S. F. Elec. League Condemns.....	425	*Western States, Review of Agricultural	
		To Investigate Ontario Commission..	283	Prospects in—by Henry C. Breck.....	96
		Will Cal. Vote State Power Bill?.....	376	*Western States, Strike Not Serious in..	300
		Water District, Idaho Irrigationists Will		Western States, Unemployment Reduced..	438
		Form Large.....	211	Western States to Plead for Reduced	
		Water Heater, Low Demand High Load		Freight Rates.....	71
		Factor, Favored in Pacific Northwest—		†Western Transportation, Crisis in.....	297
		by A. C. Crowell.....	302	Western Water Law, Some Important	
		Water Law, Western, Important Devel-		Developments—by A. E. Chandler.....	450
		opments—by A. E. Chandler.....	450	Westinghouse, George, Life of—Book Re-	
		Water Power Census.....	69	view.....	210
		Water Power Filings on Utah Rivers..	185	Westinghouse Announces Big Order from	
		Water Power Resources, West Exceeds		Japan.....	31
		Nation.....	208	Westinghouse Co. to Insure More Busi-	
		Water Resources of California to Be In-		ness, Better Business for 1922—by E.	
		vestigated.....	169	M. Herr.....	226
		Water Rights, Cal. Land Owners Fight		What the Assn. Can Accomplish Through	
		for.....	168	Education—by Laurence W. Davis..	234
		Water Supply, Utah, Immense Subter-		†What the Disarmament Conference Prom-	
		anean.....	169	ises for the West.....	43
		Water Supply Project, Cedar River, Con-		What Western Power Companies Plan	
		tract Let.....	323	for the Coming Year.....	151

V

W

	Page		Page		Page
When the Buyer of Location Meets the Seller of Opportunity—by Wm. H. Crawford	267	*Window Display, June Bride Week.....	458	*World Records of the West—from 10,000 to 220,000 Volts	59
*Where and How Western Power Companies Will Spend \$100,000,000 a Year	496-7	*Window Display, Salt Lake Store Uses Wheel of Fortune in.....	27	Would Interconnect Seattle and Tacoma City Power Lines.....	324
†Where Men of Vision Made History for the West	473	*Window Display, Suggestion for Attractive Easter	165	Wyoming—Applications for Pipe Line Filed	287
†Who Should Pay for Highway Development?	374	Window Displays, Set of Primary Rules for	203	Wyoming Judge Gives Decision Relative to Utilities	462
Why City Streets and Highways Should Be Better Lighted.....	389	*Windows, Effective	205	Wyoming Utility Assn. Holds Successful Session	327
†Why Not Develop a Western Iron Industry	335	Winning the Public—by S. M. Kennedy —Book Review	72		
Why Not Educate the Public to Change Fuses and Save Money on the Electric Bill?—by John W. Melhorn.....	340	†Wire Using Utilities, More Cooperation Among	299		
†Why Pay Freight on the Water Content of Green Timber	474	Wired Furniture Will Aid in Sale of Convenience Outlets—by Rey E. Chatfield	459		
Will California Vote State Power Bill?....	376	Wireless Communication System, Yosemite Valley	288		
Will Celebrate Electrical Week in Everett, Wash.	427	†Wireless Furor, Passing of.....	474		
Will Fight Water Power Act.....	166	Wireless of Practical Service to Western Business?—R. C. Denny, Chairman.....	406		
Will Illuminate 12-Mile Highway in Southern California	288	Wisconsin Levies Impost on Municipal Utility	73		
Willamette Falls Electric Co. Is Pioneer in Long Distance Transmission—by O. B. Caldwell	264	*Wiring Booklet Issued by California Campaign	32		
Window, Show, a 24-Hour Salesman—by C. A. Pope	319	Women Are the Country's Buyers.....	243		
*Window Display, Denver, Waffle Eating Contest	115	Wool, Western, Distribution in Western Cities	377		
		Wool Center of West, Seattle Plans to Become	122		
		Woolen Mills Are Rebuilt, Los Angeles....	516		
		Work of War Finance Corp. Outlined by Eugene Meyer	325		

Y

Yakima, Wash.—	
Annual License Fee Required of Electrical Contractors	206
Freezing Pipes Remedied by Superheated Steam in Reservoirs	210
Yosemite Valley Has Wireless Communication System	288
*Yosemite Valley New Field for Illumination	118
Your Show Window, a 24-Hour Silent Salesman—by C. A. Pope.....	319
Yuba River Development Controversies....	210

Z

Zone Postage on McGraw-Hill Publications Cancelled	32
--	----

Journal of Electricity and Western Industry

25 Cents a Copy

January 1, 1922

San Francisco

California's Developed Water Power Now Exceeds A Million Horse Power

THE Caribou Development of the Great Western Power Company of San Francisco which has just begun operation puts California well ahead of one million developed horse power.

This is the eighth plant designed and built by Stone & Webster for the power companies of the Pacific Coast.

Its water wheels are the largest of their type yet built.

STONE & WEBSTER

INCORPORATED



BOSTON, 147 Milk Street
CHICAGO, 38 S. Dearborn Street
SAN FRANCISCO, Holbrook Bldg.

NEW YORK, 120 Broadway
CLEVELAND, Leader News Bldg.
PITTSBURGH, Union Arcade

CARIBOU DEVELOPMENT, GREAT WESTERN POWER CO.,
DESIGNED AND BUILT BY STONE & WEBSTER, INC.



In appreciation of the cordial relations that have existed between you, our customers, and ourselves during the year just ended—relations which were founded on the substantial basis of service asked and service given—we extend a most sincere wish for a continuance of them and for continued prosperity for you during 1922.

Baker-Joslyn Company

Pacific Coast Distributors of

JOSLYN Pole Line Materials

PINCO Porcelain Insulators

AMERICAN Weatherproof and Bare Wires and Cables

LINDSLEY BROTHERS Cedar Poles

J-D Suspension Insulators

HEMINGRAY Glass Insulators

MACOMB Knobs, Tubes, Cleats and Insulators

TRIANGLE Armored Conductors

DETROIT Rubber Covered Wires and Cables

ALUMADUCT and ENAMELDUCT Iron Conduit

ACME Magnet Wire

ROCKBESTOS Magnet Wire and Cords

DOLPH'S Insulating Paints and Varnishes

PIERCE Renewable Fuses

V-V Conduit Fittings

BURNLEY Soldering Paste, Salts and Sticks

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, JANUARY 1, 1922

NUMBER 1

Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydro-electric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1921, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Power
Coal Age
Electrical World
Bus Transportation
American Machinist
Ingenieria Internacional
Electrical Merchandising
Electric Railway Journal
Engineering News Record
Engineering and Mining Journal
Chemical and Metallurgical Engineering

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

3

The West Has Outgrown Main Street—Prompt Development Needed for the Colorado—Injustices Through Misleading Advertising—Industrial Significance of Standardization—Channels of Distribution for Electric Irons—A Few Sidelights on Ontario Rates—Making Available Forest Products Research—The Value of a Friendly Word—Radio Message Heard in Washington, D. C.

Reducing Sales Resistance in Developing the Pacific Coast 11

By WILLIAM H. CRAWFORD

Local jealousies and inter-community bickerings must be avoided if western community sales efforts are to result in prosperity.

Standard Accounting for Municipally Owned Public Utilities 13

E. O. Edgerton, former president of the California State Railroad Commission, explains the importance of standard accounting for municipally as well as privately owned utilities.

The "Dollars and Cents" Standard of Industrial Success 15

By LOUIS F. LEUREY

A second article describing the results of the lack of trained industrial electrical engineers in industrial plants.

New Business for the Contractor in Fire Alarm Systems 17

By E. R. MURRAY

The installation of fire alarm systems offers good opportunity for study and profit on the part of progressive contractors.

Chilean State Railways Are Electrified 19

A New Record of the Western Power Industry—Frontispiece	2
Western Comment on Current Events	6
Letters to the Editor	8
Radio Bulletins	9
Builders of the West—George M. Rolph	10
Improving the Mountain Playgrounds	12
Business Districts of Western Metropolitan Centers	20
Self Improvement in Salesmanship	21
Increasing Production in Industry	23
Western Dealer, Jobber and Agent	25
Activities of the West	28
Meetings of Interest to Western Men	33
Personals	34
Manufacturer, Dealer and Jobber Activities	36
Business Outlook in Western Market Centers	37
Construction News and New Industrial Developments	38
Salvage	40

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY of CALIFORNIA, Rialto Building, San Francisco

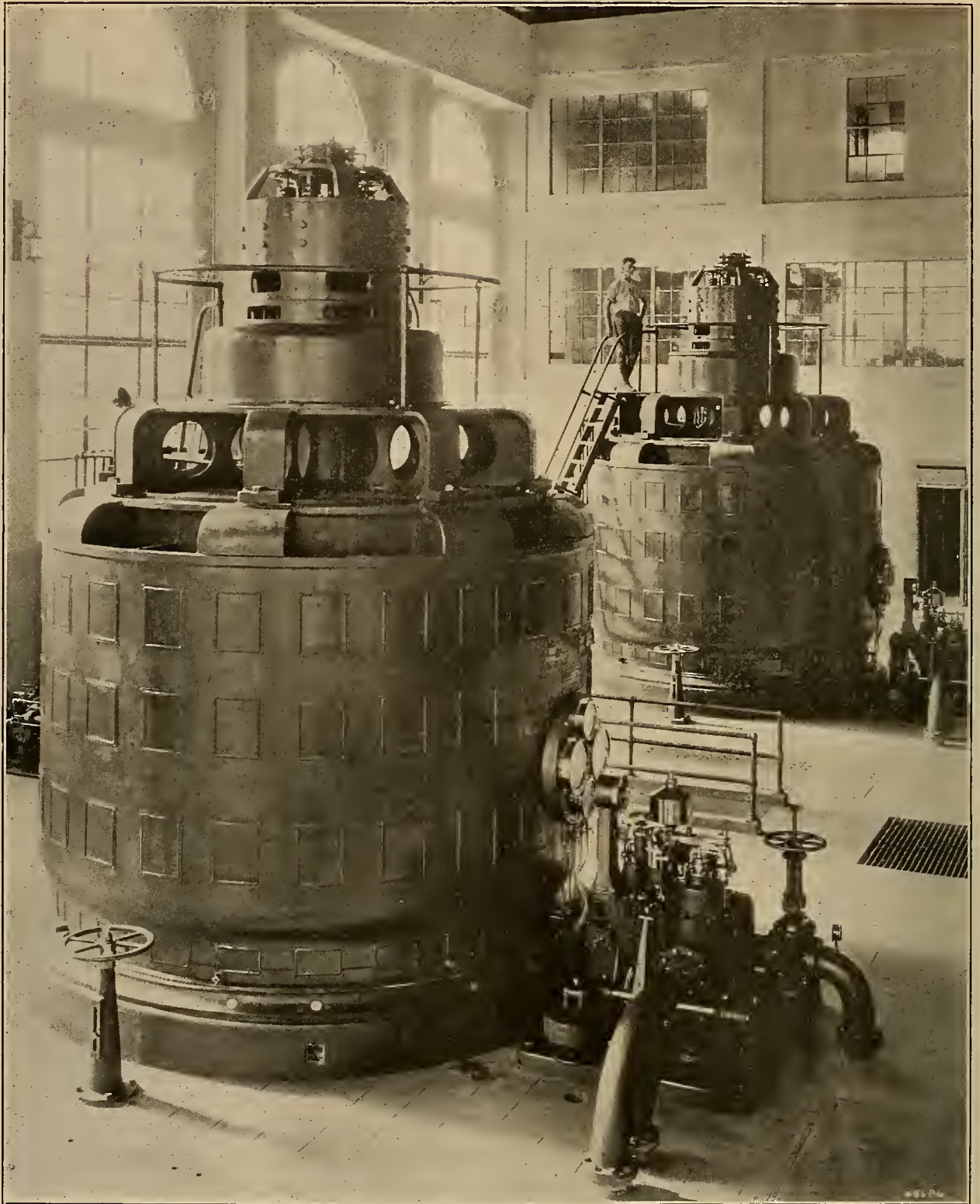
James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



A NEW RECORD OF THE WESTERN POWER INDUSTRY

THE world's highest head reaction turbines, installed during the past year in the Kern River No. 3 plant of the Southern California Edison Company. These turbines are of the single runner reaction type, of 22,500 hp. each, operating under a head of 806 ft., which is a record for this type of wheel. An interesting

feature in connection with the installation is the fact that it is arranged to operate at either 50 or 60 cycles with equal efficiency. The power companies of the West are continually working out new records of economic operation in the development of their service to western homes and industry.

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 1

SAN FRANCISCO, JANUARY 1, 1922

Per Copy, 25 Cents

The West Has Outgrown Main Street

THE small town era of every community is marked by much home oratory and generally by desperate rivalry with some nearby equally small town, whose inhabitants are without merit and whose baseball team is superior only because it hires outside talent. A little later on, the town acquires a Chamber of Commerce and the size of apples in the adjacent farming country grows and the school-hours-per-child and the park-area-per-inhabitant are quoted triumphantly against the inferior rival. Whose inhabitants, incidentally, retort with figures on the square feet of pavement and the street lighting system.

The West has long since outgrown provincialism. In every line of accomplishment, it holds a position of dignity among other sections of the country in its development. With its marvelous wealth of resources and the stimulus of pioneer conditions which it has offered, it has come to rank first along many lines of achievement, from high grade agricultural and horticultural products and mineral wealth, to hydroelectric development and many phases of manufacturing enterprise. It stands,

moreover, at a fortunate position of unexhausted resources, with its greatest development yet to come.

In working toward this development, in attracting eastern capital toward the upbuilding of the West, in bringing out the utmost that the country offers in its unfolding, there is no room for small-town pettiness. Inaccurate statistics colored to favor one community do not form a vital argument in attracting industry, nor is semi-jocular interdistrict name-calling a sane method of local advertising.

The West has a common cause in its need for outside capital and a common bond in its sectional pride. If it is to develop on a permanent basis, it must develop, each district in accordance with its natural advantages of position and resource. What is needed is a coast-wide study of common problems and cooperative action toward their solution. Why should there not be a Pacific Coast Manufacturers' Association and if you will, a West-wide Chamber of Commerce? It is time for the entire West to stand together and to work together toward a common goal.

Prompt Development

Needed for the Colorado

TO those seeking a more general knowledge of the problems attendant upon the full development of the Colorado River, the Riverside convention of the League of the Southwest was a success. For those who expected more than this, it was a failure. The San Diego hearing was but little more satisfactory. Secretary Fall's stand that the project should be carried out by the government is uniformly approved, providing the government is prepared to go ahead with the project immediately. It still remains for Congress to pass upon the project, however, before money can be appropriated for its carrying out—and in the meantime there is no prospect of immediate work upon the Colorado.

The power need is not for the moment pressing, although it is none too soon to prepare for the development of the future—but flood control cannot wait. One of the most impressive talks of the Riverside meeting was the account of the patrol of the river with pickaxe and shovel which is a yearly vigil of farmers along its banks, followed, despite all precautions, with the loss of crops and land when the river rose beyond control. Few people realize how

close the Imperial Valley region came to another flood during the past year, when, for a stretch of three miles, the Colorado rose a foot above the Volcano levee. Night and day work and a rampart of sand bags was all that saved the basin.

It is now urgent that the matter be brought before Congress so that, if the government does not care to spend the nation's money in this development, it can step aside and make way for private capital. With its acknowledgment of prior rights to irrigationists both above and below the Grand Canyon and its willingness to submit to strict regulation and its readiness to start immediate work, the offer of the Southern California Edison Company is difficult to refuse. The West is not so much concerned with the question of who does the work as it is with the getting of it done. What is needed is prompt action.

Injustices Through

Misleading Advertising

ONE of the boasts of the electrical industry has been the fact that even during the war and post-war period, its rates remained low, the increase over 1920 figures never rising above 12 to 15 per cent.

Clothing at the same time registered an increase of 225 per cent, coal 155 per cent, while the average of all commodities showed an increase of 125 per cent. It is therefore particularly unjust to find recent advertising by a firm manufacturing toilet articles, bracketing fuel and light under the same head and featuring them as the highest commodities on the market at the present time. The advertisement consists of little sketches indicating how much of given commodities could be purchased for the same amount of money in 1915 and 1921, with a view to featuring the particularly low cost of their own products. An electric lamp and a coal scuttle are shown side by side and credited with increased costs amounting to 99 per cent. This is misleading and a real injustice to the electrical industry, which should take pains to give wide publicity to the facts of the case.

Another instance of rather more deliberate injustice is the advertisement of an insurance company recently called to our attention. This shows a scene of wreckage and features in bold headlines the fact that Sacramento, California, was recently visited by a tornado which carried destruction in its wake, urging prompt insurance of the property of the reader in order to provide for such loss. Now a tornado in popular parlance implies a catastrophe of the same rank as a cyclone or an earthquake of some proportions. Those familiar with western climatic conditions in general or with the storm in question will recognize that it was worth mentioning only because it was the only "twister" history records in California. It did little more damage than to injure a roof or two. Advertisements of this sort should not go unquestioned. Usually the firm who runs them will withdraw them when protest is made—or if too flagrant, one of the functions of the Federal Trade Commission is to rule on questions of misleading advertising.

Industrial Significance of Standardization

MUCH has been said of the menace of German industrial competition in foreign and even in local markets. The bulletin recently issued by the American Engineering Standards Committee on Industrial Standardization in Germany is of especial significance as indicating one of the elements in the situation which is of greatest advantage to German manufacturers in serving foreign customers. The organization for the standardization of industry in that country is highly developed and far-reaching, paying particular attention to dimensional standardization, a factor which involves interchangeability of supplies and machine elements, and the interworking of parts and of related apparatus made by different makers. The electrical industry is particularly advanced in this work.

There is no need to turn to Germany for arguments in favor of development along lines of national standardization of American industries. Standardization stabilizes production, in that it relieves the manufacturer of the dangers of shifting require-

ments and makes it possible for him to accumulate stock. It reduces selling costs and places the buyer and seller on understandable terms with one another, thus promoting fairness in competition. It lowers costs, eliminates waste effort on scattering lines, and makes for efficiency. It is one of the basic requirements for satisfactory relations in establishing a foreign trade. And last, but not least, as has often been pointed out to the electrical trade in these columns, it increases the confidence of the public who are impatient of inconvenience and confusion brought about where standardization has not been considered.

American railroads were the first to adopt uniform track gages and American lamp socket manufacturers were the first to consider the convenience of a moving public. We cannot afford to fall behind in the less conspicuous but equally important field of industrial standardization.

The advent of the electrical home in the West and the widespread use of electrical appliances in this region, make the question of the standardization of plugs and outlets one of particular importance. How long will it be before we realize that a practice which results in annoyance to the purchaser, as does the lack of standardization in this field, is really one of the greatest drawbacks in the selling of the electrical idea?

Channels of Distribution For Electric Irons

ELECTRICAL retail establishments sold 58.5 per cent of the electric irons produced by seven manufacturers during 1921. This is a slightly less proportion than during the previous year, when 59.9 per cent were distributed through this channel. Irons sold by the hardware trade decreased even more markedly, both in percentage and number, 1921 figures accounting for 18.4 per cent of the output through this channel. House furnishing and department stores increased somewhat as an agency for this product, sales increasing from 10.7 per cent in 1920 to 9.8 per cent in 1921. These figures are significant of conditions as indicating the growing importance of the department store as a factor in retail distribution.

Figures for six months of 1921 are as follows:

Company	Distributed Through Electrical Trade	Through Hardware Trade	Through House Furnishing and Department Stores	Miscell. Channels	Total Production
A	2,500	2,500	5,000	2,500	12,500
B	15,000	30,000	7,500	7,500	60,000
C	76,000	1,000	1,000	800	80,000
D	.....	.....	.....	.....	.....
E	60,000	20,000	5,000	.....	85,000
F	25,000	1,500	14,000	5,000	45,500
G	25,000	15,000	12,000	12,000	64,000
H	87,000	21,000	21,000	21,000	150,000
Seven Companies	290,500	91,000	66,100	48,800	497,000
Percentages	58.5%	18.4%	13.3%	9.8%	100%

The full importance of the electrical dealer is not wholly apparent from this statement, however, as the three largest manufacturers of irons are not included in the compilation of figures. The larger well established firms are always those which find their widest distribution through the electrical trade.

while the newer and smaller companies entering the field are forced to use the hardware, the house furnishing and department stores. Even these products, however, find their widest distribution through electrical channels. The survey, which is the result of a questionnaire sent out by the eastern office of the McGraw-Hill Company, is a striking tribute to the importance of the electrical retailer in the chain of electrical merchandising.

A Few Sidelights on Ontario Rates

THERE has been much talk recently of the Ontario Power Commission, its schedule of rates being quoted by advocates of municipal and state ownership of electric utilities to indicate what striking reductions in rates would result were the government to go into the power business. Like most comparisons which involve municipal and private company accounting, it is difficult to come to a fair basis of comparison. Ontario figures, except in isolated instances of lighting rates, are quoted in terms of the "horsepower-year." This is a maximum demand rate. That is to say, it is as indefinite as the early flat rates of the western power companies, under which the possessor of a 24-hp. motor was charged on the basis of the rating of his motor, irrespective of the extent to which he used it. A manufacturer who had occasion to use power for eight hours of the day only, would thus pay for 24 hp., whereas his use of electricity would amount to the equivalent of 8 hp. In other words, the rate in such a case is in reality three times as heavy as it would appear. No comparison of rates of this type can be made. Figures quoted by one system may refer to a customer on their own lines with a 20 per cent load factor, while the instance quoted from their competitor's books may refer to a case in which the plant operates at continuous load.

If individual cases can be taken—and Ontario does not hesitate to compare an average rate on their own lines with a maximum rate in Denver—it is possible to find flat rates on the systems of almost any privately owned system which are lower than the Ontario rates quoted.

It is significant that in public discussions aimed to show the success of the Ontario system, figures are not given in terms upon which any comparison can be made. It is easy to present any condition in a favorable light, if your hearers are ignorant of the unknown factors involved—but it is only fair that those who listen should understand that comparisons in this case, if not odious, are at least misleading.

Making Available Forest Products Research

FOR more than ten years the Forest Products Laboratory at Madison has been studying wood, always with the object of developing its most efficient and economical use. During that period it has amassed a great deal of scientific information of the most practicable application. Great credit is con-

ceded the Laboratory for its research accomplishments but in the final analysis the value of its work must be measured by the extent to which the results of its work are known and effectively applied by the wood manufacturing industries. It is believed that this phase of the Laboratory's work is not being developed to an extent which its research results and industrial needs justify.

There is at Madison, we understand, a great deal of information which it has never been possible to supply to the industries, because the Laboratory has not had the money or men to put this information in usable shape for the business man. From the standpoint of the West, the value of this experimentation depends largely upon the extent to which it can be disseminated.

In order to carry on this publicity, the Laboratory's appropriation should be increased a minimum of \$100,000. Those interested in the effective continuation and development of the Forest Products Laboratory should see that their local representatives in Congress are impressed with the importance not only of providing the normal appropriations for its work but in urging the moderate increase for the special purposes outlined.

The Value of a Friendly Word

MERE friendliness is one of the most important of selling appeals. The importance of a friendly attitude toward the public is strikingly brought out by a recent letter sent out by the J. B. Terry Company of Cedar Rapids, Iowa, to central stations throughout that state. The letter contains the following paragraph:

Something was wrong with the retail sales of a large central station. An expert was called in to find out the reason for the slump in sales. The store was attractive, the merchandise of dependable quality, the place was well lighted, the terms of sale were agreeable, but the trouble was—the clerks always let the customer break the ice. The atmosphere was chilly. The expert told the manager to insist on every clerk saying "Good morning" with a smile, and saying it first. The sales the next six months increased 33 1/3 per cent—practically all of which was traced to the "Good morning." It will cost you nothing to insist on this and it will pay well.

The thing is very simple—and the reason back of it is that folks, including customers, are merely human and react to the same qualities in their business relationships that they do in the choice of their friends.

Radio Message Heard in Washington, D. C.

REPORTS have been sent in from as far off as Washington, D. C., and Minnesota, that the Monday radio news bulletins of this office have been heard and enjoyed. This means that this message of western business reaches practically every one of the 700,000 radio amateurs who are listed in the United States today. The Journal of Electricity and Western Industry is pleased to have been one of the first to recognize the importance of the radio phone as a medium of business importance, as well as a source of entertainment.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Urge Prompt Development of Colorado

Unless Government Is Prepared for Immediate Development, It Should Not Stand in the Way of Private Enterprise

FLOOD dangers in the Yuma and Imperial regions necessitate immediate action upon the Colorado, according to J. B. Lippincott, consulting engineer of Los Angeles, who spoke on December 16 before the Engineers' Club of San Francisco. Mr. Lippincott pointed out that 86 per cent of the flood waters of the Colorado enter the river above the proposed site of the upper or Glen Canyon reservoir and that the most favorable location for power development was at this point. Irrigation interests, on the other hand, find their ideal site at Boulder Canyon. Protests from the upper river on the ground that lower development would curtail their possibility of appropriating water later on were satisfied by figures which show that with the storage of flood waters, the entire 4,812,000 acres in the irrigable area of the Colorado basin could be served, with something more than 1,000,000 acre-feet yearly surplus. In conclusion, Mr. Lippincott urged that unless the government was prepared to follow up the immediate construction of one or the other of these projects, it should not stand in the way of private capital which is ready to begin prompt development. He said in part:

"The Secretary of the Interior has taken an unofficial stand in favor of government development, which closes the discussion for the moment. If it is not carried out soon as a federal project, then it would appear best to permit it to be undertaken as a private enterprise regulated by state and national authority as is provided in the Federal Power Act.

O. C. Merrill, executive secretary of the Federal Power Board, explained the provisions of the Water Power Act as they applied to the Colorado situation, pointing out the safeguards to irrigation and flood control in case of private development of either site.

New Cooperative Method Announced

California Canner to Act as Distributor For Fruit Growers' Association on Cooperative Basis

CONSIDERABLE importance is attached to the arrangement announced by Hunt Bros. Packing Co. of San Francisco, by which this well-known canning firm is provided with a steady and satisfactory supply of raw material. They have made a contract with the Fruit Growers of California, Inc., of San Jose, whereby the latter agrees to furnish, for can-

ning purposes, a stipulated amount of fruit and vegetables each year in the various varieties in which its members are concerned.

Hunt Bros. Packing Co. will pack and sell the fruits grown by the members of this cooperative organization, handling the tonnage delivered on a cooperative basis, and returning to the growers their share of the proceeds. This arrangement, while providing the canning company with a satisfactory supply of fruits and vegetables, insures the growers an outlet for their product and their proper proportion of the proceeds.

This policy will be general with the packing company, and it is understood that similar arrangements are expected to follow with other growers' cooperative organizations and also with individual growers with whom the canning company has been doing business for many years.

This marks a new adventure in the realms of cooperation in which the West has already achieved so much success. It comes on the one hand as a reaction against the growing tendency of canners to own their own sources of raw materials, and on the other, the operation of canneries and packing houses by the farmers themselves. In the incentive which it offers to the grower to maintain the highest grade in the products furnished for canning, as well as the guaranty of an adequate supply, the arrangement would seem to have solved one of the great stumbling blocks to individual contracts.

Alaska Mining Development for 1919

Government Census Report for Alaska Mines Shows Prevalence of Isolated Plants in This District

ALTHOUGH the output from all mines in Alaska decreased slightly from 1909 to 1919, the size of plants and the number showing permanent installations had greatly increased. The number of enterprises decreased in the past ten years from 607 to 346. This is indicative of the change in character of organization, the typical working in 1909 consisting of small bonanza outfits, mostly engaged in the placer mining of gold. Lode mining which requires more machinery and fewer men has largely displaced the old methods at the present time.

An idea of the character of power development in the territory is seen from the statistics which show 29,979 hp. in use by mining enterprises, 29,829 of which was developed by steam engines and turbines, internal combustion engines and water wheels

and turbines owned by the operators using them. Seven electric motors operated on purchased current amounted to not more than 150 hp., whereas 468 electric motors were used in plants in which the power was generated on the spot. Fuels used in power generation were as follows:

Coal, bituminous	(tons)	8,387
Wood	(cords)	24,812
Fuel oils	(barrels)	165,780
Gasoline and other volatile oils.....	(barrels)	1,990

Colorado Protests Preferred Rates

Through Rates From Atlantic to Pacific Coast
Would Cripple Wholesale Business
in Intermountain District

ARGUMENTS against the proposal of transcontinental railroads to establish through rates from Atlantic to Pacific Coast points were presented to the representatives of the Interstate Commerce Commission at a recent hearing in Denver. It was pointed out that the manufacturers and jobbers of the Intermountain district would be isolated, so far as business is concerned, if the railroads carry through their plan. It would be possible, it was argued, for San Francisco merchants, jobbers and manufacturers to pay freight on commodities purchased in the East and to reship them back to Denver to undersell the producers of similar commodities there. Similar hearings were held later in Helena, Montana, and Salt Lake City.

Coast cities, on the other hand, contend that the development of jobbing centers in the intermountain district was largely the outcome of artificial conditions obtaining during the war period when canal shipments ceased and that the welfare of the country demands that both rail and water transportation be allowed to maintain a healthy business to coast points.

It is reported that the intermountain interests will take the matter to the Supreme Court if the present appeal of the railroads is granted.

Over 13,000,000 Hp. in Western Filings

Report of Federal Power Commission Indicates
Need for Larger Personnel to Handle
Great Volume of Applications

ACCORDING to the report of the Federal Power Commission recently issued, there have during 16 months been 185 applications filed for preliminary permit and 85 applications for license to develop water power, which, after deducting conflicting applications and those rejected or withdrawn, aggregated the stupendous total of 16,826,000 hp., estimated installation. This is twice the water horsepower which has been developed in the United States to date, and from five to six times greater than the aggregate of all applications filed with the Federal Government during the preceding 15 years.

The country could not, of course, absorb at once all the power projected for development, and many applications may never be carried out. It is the belief, however, that the greater part of the horsepower involved will eventually be constructed. To

complete the projects applied for will require capital exceeding in the aggregate two billions of dollars. The collateral expenditures for distribution systems, for customers' installations, and in accessory industries will be several times greater.

The distribution of applications by states is as follows:

	Number of applications	Horsepower	
		Primary (90 per cent of time)	Estimated installed capacity
Alaska	31	217,200	279,060
Arizona	13	3,544,160	4,750,000
California	80	2,118,810	4,057,075
Colorado	4	50,660	100,900
Idaho	12	90,650	189,185
Montana	14	319,875	532,450
Nevada	1	(Transmission Line)	
New Mexico	1	2,750	25,000
Oregon	10	466,060	832,860
Utah	6	918,015	1,212,465
Washington	18	699,930	1,112,640
Wyoming	4	1,410	1,410
Total Western States	194	8,429,520	13,093,045
New York	16	1,712,845	2,192,830
All other states	50	917,545	1,540,350
Total,	260	11,059,910	16,826,225

Large Electrical Trade with Orient

October Exports Show Growing Importance
of Trans-Pacific Trade in Electrical
Apparatus and Accessories

SHIPMENTS of electrical goods to the Orient during October indicate the growing importance of that part of the world as a market for American-made electrical equipment, oriental business making up a large percentage of this export, says a statement just issued by the Department of Commerce. When shipments to contiguous markets like Canada and Mexico are set apart, the value of the Far Eastern exports becomes all the more apparent.

An interesting new market for heating and cooking apparatus is Kwantung in China, to which shipments valued at \$8,827 were sent during October. The total for the month in this class was \$74,302 worth.

Of a total of \$161,462 worth of meters and measuring instruments, October shipments to Japan were valued at \$40,447. Of \$779,338 worth of motors and dynamos shipped, Japan absorbed \$127,409 worth. That country also received the largest shipments of motors—\$88,678 worth, and rheostats and controllers to the amount of \$12,588.

Heavy shipments of switches and accessories across the Pacific during October are noteworthy. While Canada received the largest amount, exports to China were valued at \$56,718, and Australia's purchases at \$21,890. A total of \$176,154 worth was exported to 38 different markets.

Telegraph apparatus exported during October was valued at \$42,769, the largest shipment being to Hongkong. Transformers valued at \$464,281 were exported during the month. Shipments of \$119,751 worth went to China and \$77,670 worth to Chile. France was the most important European buyer, taking \$74,060 worth.

October exports included in the miscellaneous classification "All other materials" amounted to \$1,737,477, the three most important markets being Canada, Japan and Italy.

Letters to the Editor

Senator Rominger Comments on Features of California Water and Power Act

To the Editor:

Sir: Under the initiative measure proposing the California Water and Power Act, the control of expenditures will be entirely in the hands of a Board of five members, only one of whom would be a paid official, the others receiving compensation at the rate of \$20.00 per day when service is performed. Three members of such Board will constitute a quorum. This would result in the executive direction of the enterprise being practically in the hands of one man. Contrast this with the proven necessity for fifty or more seasoned experienced executives of the privately owned companies of the state who under State Railroad Commission regulation are successfully developing the state's electrical resources and providing the means for intensive growth with increasing community wealth, upon which the future prosperity, if not the very existence of the state depends. This one-man Board would be responsible for the construction of works for the delivery of power and water, for making contracts with municipalities, for the issuance and sale of five hundred million dollars of state funds, for the fixing of just and equitable rates, and at request of municipalities, for the acquirement or construction of distributing systems in hundreds of municipalities in the state.

It is true that state bonds would sell at a lower interest rate than the bonds of the public utility corporations, but of what avail would this be if the cost of construction under this experiment should be two or three times as much as the necessary cost under private initiative with public regulation? Take the Los Angeles power developments. Publicly in December, 1912, the Los Angeles voters were promised that 120,000 horsepower would be developed along the line of its aqueduct at an estimated cost of \$7,200,000. The Los Angeles Power Bureau's report at June 30, 1921, shows that 72,000 horsepower has been developed and that the cost has been \$10,800,000. At the same rate the total cost of development for 120,000 horsepower would be \$18,000,000, or two and a half times the original estimate. Which then is the cheaper—\$100 at 8 per cent, or \$250 at 6 per cent?

Truly the question has been asked as to what would happen if any of the state projects should fail to bring results. It is pointed out that the act places the taxing power of the state behind all projects. Again, let us see what happened under a similar scheme in Los Angeles. In January, 1913, the voters were publicly promised that a certain bond issue would finish the generating works and provide a complete distributing system, making it certain that the city tax payers would be relieved from further taxation. The official record to June 30, 1921, shows that the tax payers have paid \$5,385,000 for practically all of the annual interest and sinking funds on these municipal power bonds which were presumed to pay their own way. During the same period only \$605,000 was contributed from the earnings of the municipal system.

Such records as these will keep the people from being misled by the repetition of roseate promises. The danger of failure is much greater in the state proposition than in a local municipal undertaking, since to be successful at all the state proposition must include all of the power development within the state, and its distribution to all municipalities. On this basis, the \$500,000,000 of bonds, staggering in

amount as it is, would be entirely inadequate to perform the task. No one would anticipate successful operation of the public system if long transmission lines must traverse territory and pass through municipalities not using any state service. It is inconceivable that the individual voters in all of these municipalities would simultaneously adopt this experiment, and the result would be that one municipality being served, the lines would have to travel perhaps hundreds of miles through barren territory to some other municipality which might choose to try the game.

JOSEPH V. ROMINGER,

Long Beach, Cal.

State Senator of California.

Bell Loud Speaker, not Magnavox, is Used in Transmitting President's Speech

To the Editor:

Sir: In reading your recent editorial on "Making a Speech to a Nation," I agree with you thoroughly until we come to the statement, "... it is pleasing to remember that a western invention played an important part in its success."

If, in this connection, you refer to the Magnavox, then I must disagree with you and take this opportunity to let you know that the Magnavox had absolutely nothing to do with the Armistice Day services. I appreciate, however, how this error may have crept into the minds of the uninformed, because we took special precaution not to advertise unduly the Bell Loud Speaker. You will appreciate that the Bell System did not want to let any scientific achievement detract from the dignity and solemnity of the occasion. Hence, we took precautions to keep the scientific end of the Armistice Day service entirely in the background.

A. J. CHAMPREUX,

Transmission Engineer, Pacific Tel. & Tel. Co.
San Francisco, Cal.

Salt Lake Jobber Holds that Recovery from Depression Depends on Individual

To the Editor:

Sir: While business in general in these parts is rather dull, business men are organizing and making every endeavor to protect and secure whatever business is available.

The dealers throughout this section are largely looking to the jobbers for guidance in the conducting of their business for the coming year. In this connection I am sending herewith extracts from a letter received by a Pocatello dealer from Mr. J. A. Kahn, president of the Capital Electric Company, which I think worthy of passing on to your readers.

"While we are largely subjected to local conditions, we are still vitally dependent upon national, and in fact international conditions. Consequently I have to form my personal opinion on that basis.

"It seems to be the general impression that we have reached the bottom and are now beginning the ascent. However, profound students of economics point out that three times in our national history prices have multiplied two and one-half times, each of these periods occurring immediately after a big war, and that fluctuatingly, but consistently, declines took place over a period of twenty-five to thirty years that reduced prices to nearly their previous low point. Prior to 1920 prices increased intermittently for thirty years and if history repeats itself, which it has a fixed habit of doing, prices will go down for the next twenty to thirty years. This will cause business men of your age and mine to unlearn everything we have learned. We have gained our business training during a period of consistently increasing prices.

"During our business careers we have had the advantage of being able to sell our goods on a rising market and the principles of doing business under that happy condition are very much more favorable than when the general market has a declining tendency. In the long pull period ahead we will have to buy more scientifically and sell more intensively and intelligently. By this I mean our salesmen will have to be better trained and work harder.

"I recently read of an experience the Gimble Company had. They found that in their Chicago store the drug department was not doing a satisfactory amount of business. They tried the following experiment: They put a lot of trays in their show cases upon which they put articles that would naturally go together. For instance, on one tray they put a tooth brush, tooth powder, tooth paste, listerine, mouth wash, etc. On a tray with safety razor blades they put shaving cream, soap, face lotion, talcum powder, etc., and carried out the idea throughout every line. If a customer said 'I want a tooth brush' the tray with a tooth brush, etc., was placed on the counter. They found that the first month after this innovation was applied, their drug business increased 500 per cent. This shows conclusively that sales people are not selling and suggests a lesson that dealers in other lines could well afford to adopt. If a customer comes into your store to buy any article, inquire by display and suggestion as to other articles that naturally associate themselves with the article asked for.

"Another thought: Do you know that 90 per cent of all goods bought at retail in the United States are bought by women? That being the case, dealers should select such sales people as will appeal to women and know how to appeal to and serve them. Their appearance, language, courtesy, chivalry and habits should be determined to be above reproach before being engaged. Your sales people should be trained by you to thoroughly know all the goods you carry and memorize the selling prices. They should become experts in their line so that when they serve a customer the impression made should be so favorable that the customer will tell her friends.

"Business is going to be what we make it. Any merchant by having an honest policy, a well located store, properly arranged to attractively display his stock, kept clean and inviting and provided with representative sales people rightly trained and instructed into the new order of business, will succeed and prosper.

"If you can create business out of possibilities that exist, but that might not naturally develop if not created by you, your company can secure a profitable volume. I feel it is my province and my positive duty to spread this sort of gospel, for we and the manufacturer are at the mercy of the retailer. If he does his part of the job by making sales and not supplying demands, our business will grow; if not, we cannot hope to expand it.

"To sum up this lengthy dissertation. Is your store and stock as attractive as you can make it? Are your clerks qualified and instructed to appear and deport themselves appealingly to 90 per cent of your customers, namely, women? Have they a thorough knowledge of everything they attempt to sell? Have they memorized the selling prices of everything in stock? Do they realize that their personal earning power is dependent upon the number of persons who seek them out to serve them? Do they know that their employers' firm policies are honesty, courtesy, and a desire to disseminate information regarding the process of manufacture, service, care and application of the goods he sells? If not, then your urgent job is to instill that information and give the training."

B. E. RAWLEY, District Sales Mgr.,

Edison Electric Appliance Co.

Radio Bulletins

The Journal of Electricity and Western Industry offered the following review of events of the week as its regular Monday night engineering and industrial review on December 20th:

The conference at San Diego, called by Secretary of the Interior Fall, will recommend to Congress that the national government develop the Colorado River project. Power will be a minor consideration, irrigation and flood control coming first.

The Construction Company of North America, a San Francisco firm which is driving the Hetch-Hetchy tunnels, has made an offer to the U. S. government for the Muscle Shoals project on the Atlantic coast, which is reported to be considerably in excess of the offer made by Henry Ford for the same development. Officials of the San Francisco company have gone to Washington to discuss the offer.

The California State Harbor Board has called for bids for the first unit of the two-million-dollar water and rail terminal which is to be erected on San Francisco Bay.

Exports from Portland, Oregon, during the month of November exceeded six million dollars. Two-thirds of the amount consisted of wheat, sent to Asia and Europe to make up the shortage of crops in countries there.

Shipyards on San Francisco Bay launched twenty-seven ships during 1921, aggregating 240,000 tons. Three of the largest vessels ever built on the Pacific Coast were included in the list.

The bridge across San Francisco Bay has received the approval of the government officials in Washington, D. C. Plans are already under way for a preliminary survey which will cost \$150,000.

While the Northwest is in the grip of storms which have done hundreds of thousands of dollars property damage and caused the loss of several lives, weather officials report that rainfall in central and northern California and Nevada is less than half the normal amount to date. In Nevada there is already a fear of shortage of water both for irrigation and power purposes.

The Journal of Electricity and Western Industry offers the following business summary for the principal cities of the West:

San Francisco: The holiday business is in full swing. Post office officials announce shipments by mail are breaking all records. Wholesale trade is only fair as is industry. Unemployment has decreased slightly. Fair sized price reductions are expected in many lines immediately after the holidays.

Los Angeles: Rainfall to date is normal, yet has not interfered with the harvesting of the citrus crop, which promises to be large. The building boom has apparently not reached its peak. The motion picture industry which has been almost dead for a year, is expected to reopen on a large scale after the first of the new year.

Salt Lake City: Christmas buying is progressing satisfactorily. Electrical devices are moving rapidly owing to an intensive cooperative sales campaign. Loans advanced by the War Finance Corporation to farmers and stockmen have brought some relief.

Denver: Reports are being widely circulated that there will be a resumption of activity in the mines throughout the Intermountain district after the first of the year. Production in the flour mills is fifty per cent above last year. General business conditions are better than in any other city in the Tenth Federal Reserve District.

Portland: After a slight recovery business has again been crippled by severe storms which have caused considerable property damage and tied up transportation. Production of lumber is slightly below normal and there is a scarcity of logs.

Seattle: Six inches of snow in Seattle together with a heavy rainfall throughout the inland, demoralized business during the past week. Property loss to telephone and power companies was heavy while several lives were lost. Washouts and slides tied up transportation completely. Even the seasonal holiday trade has been affected and sales have dropped off considerably.

Builders of the West

"SUGAR is nothing more nor less than concentrated sunshine." This statement adorns the title page of a most complete, exhaustive and entertaining volume entitled "Something About Sugar." George M. Rolph, general manager of the California and Hawaiian Sugar Refining Corporation, who speaks so authoritatively on the history, growth, manufacture and distribution of this commodity, could not have more accurately described his own personal characteristics, according to the unanimous statement of those who know him. And "those who know him" includes all the employees of his company. It seems quite logical that he should have acquired some of the characteristics of sugar since his pet hobby is the company's refinery at Crockett, California, where he spends any available spare time he might have.

Mr. Rolph was born in San Francisco in 1873, and is from one of San Francisco's oldest families, consisting of five brothers and two sisters, all of whom have been prominent in San Francisco's growth and development. After successfully surviving a midnight tumble down a stairway in his father's arms, while assisting in routing a burglar, he has had a life of color and adventure. He attended public school in San Francisco, his work being marked by a passion for mechanics. While his eldest brother, James, now mayor of San Francisco, displayed his executive ability in managing the younger members of the family, George Rolph spent his time repairing the plumbing and inventing derricks to hoist water tanks to the top of the family residence. Upon his graduation from Cogswell College he was offered a position as instructor in mechanics at Stanford University, but decided to learn his trade as machinist in the Risdon Iron Works. This accomplished, Mr. Rolph went to work as storekeeper for the Sanger Lumber Company in the mountains back of Fresno, California, where he remained some six years, rising through the various positions until he became superintendent and manager. He was selected for his



GEORGE M. ROLPH

Builder not only of structures and institutions, but of men; one of the foremost authorities in the world on sugar and its manufacture; an engineer and able executive, who holds the sincere regard of the entire personnel of the concern which he directs.

executive ability as secretary of the Hawaiian Commercial and Sugar Company and remained in this position for about five years. In 1903 he went to the Hawaiian Islands as assistant manager for Alexander and Baldwin, Limited, which is one of the largest companies operating in the sugar industry of these islands.

It was while in the Hawaiian Islands that he organized practically all of the plantations into the Sugar Factors Company, Limited, so as to better market and ship the combined sugar produced by these various plantations. Upon his advice the Sugar Factors Co. purchased an old beet sugar refinery located at Crockett, California, and organized the California and Hawaiian Sugar Refining Company to operate the refinery. Mr. Rolph was placed at the head of this new company as its general manager. The refinery was

placed in operation in 1906 with a capacity of 200 tons per day. Under his able and efficient management it has become the largest and finest sugar refinery in the world, with a daily capacity of 2250 tons.

Here, every modern device for the rapid, economical and efficient refining of raw sugar has its parallel in the provisions made for the welfare, health, education, entertainment and amusement of the employees and their families.

At the request of Herbert Hoover, Mr. Rolph was appointed Chief of the Sugar Division of the United States Food Administration, and later when the United States Sugar Equalization Board was incorporated he was elected president. This board was a clearing house for all sugar problems, supplies, prices and distribution. Mr. Rolph was also a member of the International Sugar Committee.

He has always been active in the city in which he was born and has been one of the commanding leaders in the work of the Chamber of Commerce.

To George M. Rolph, then, builder of men as well as of structures and institutions, engineer and able executive, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Reducing Sales Resistance in Developing the Pacific Coast

**Local Jealousies and Intercommunity Bickerings Must Be Avoided if Western Community Sales Efforts are to Result in Commercial Prosperity.
An Appeal for the "All-Pacific-Coast" Standpoint.**

By WILLIAM H. CRAWFORD

OF recent years, the art (or science) of selling has extended to community advantages. Ancient history may have some examples of competition between cities for commercial and industrial supremacy, but not until the last decade or two have we witnessed in the United States and Canada, aggressive selling methods applied to setting forth the various advantages of different localities. This has grown to be a business in itself, usually fostered by a local chamber of commerce or commercial club.

The Pacific Coast of the United States, progressive in all things, gives many striking evidences of modern sales methods applied to community development.

The entire area west of the Rocky Mountains must be regarded as an economic unit, although, of course, it could be subdivided on account of its size, topography, freight rates, railroad connections, distances and density of settlement in such a way as to be made most convenient for actual business operations. The aim of every community on the Pacific Coast should be to thus regard this wonderful area which comprises 25 per cent of the surface of the United States, and at the present time supports approximately 8 per cent of the population.

The next 25 per cent strip going east supports approximately 12 per cent; the next 25 per cent strip, approximately 20 per cent, and the last quarter, comprising the Atlantic Coast area, supports approximately 60 per cent of the population.

Distribution Problem Difficult

With this picture in mind, showing how the density of population thins down as one comes west, it is quite apparent that the Pacific Coast must present some difficult problems in the way of distribution, in order to prevent excessive business overhead. A redeeming feature to the problem on the Pacific Coast, however, is seen in the wealth per capita which means greater buying power, and in the growth per decade as compared with the entire United States. The Pacific Coast has been growing two and one-third times faster on the average per decade for the past three decades.

The wealth of raw material in these western states, the climatic advantages, the strategic location with respect to present and future Oriental markets, makes this coast line a very attractive field of operations.

On the industrial side of the problem, there are three main classes of manufacturing plants that form "prospect" files for the communities that feel they have something to sell.

First, those plants located elsewhere that wish to establish Pacific Coast branches in order to take care of manufacturing and distribution in new fields.

Second, entirely new enterprises to be located on the Pacific Coast to take advantage of Pacific Coast raw material supply and other opportunities.

Third, establishments located elsewhere, but desiring to relocate, entirely, as a result of exhausted raw material supply or mistakes made in the original location.

Unless these concerns are purely local in aspect, catering to the population within a small radius, the only satisfactory way to approach the problem of new location, is to determine where all the elements entering into manufacture combine best with the four main distributive market requirements, namely: international, national, Pacific Coast, and local.

Communities, like individuals and some private corporations, often make the mistake of over-estimating their own advantages or their own product and greatly under-estimate that of their competitor.

Commercial Bodies Often to Blame

This tendency has to a great extent discredited the efforts of many otherwise able commercial bodies. Such ill-advised efforts, for example, as preparing a map out of all proportion showing one community served by numerous railroads and steamship lines, while adjacent cities of equal importance are depreciated to the status of a mere flag station or steamboat landing.

It is really surprising how much of this "small town stuff" is indulged in. Thousands of dollars of money raised for community publicity is thus squandered every year, because the only ones who get any satisfaction out of that sort of propaganda are the people who prepare it.

The real business prospects—those whom it is desirable to reach—pass over this one-sided propaganda and seek elsewhere for facts that will be of real help in solving the particular industrial problem that may be uppermost at that time.

There is so much to be learned about the Pacific Coast, it is such a country of magnificent distances and marvelous natural resources, that the world at large must be told in the quickest, most effective manner.

Should Avoid Community Jealousies

Community jealousies, one-sided propaganda, misdirected sales efforts, simply cloud the big issues and represent a vast economic waste.

The entire Pacific Coast area is yet in its commercial infancy. Communities that have already developed the interior; on Puget Sound, on the Columbia River or San Francisco Bay and in southern California, are but the beginnings of the industrial and commercial map of 1950.

There is probably no more favored area in the entire United States than that great country lying west of the Rocky Mountains, toward which the eyes of the nation have turned.

Theodore Roosevelt, when president, had a great vision regarding the Pacific Coast and one of his famous remarks is often quoted:

"The Mediterranean era died with the discovery of America; the Atlantic era has reached the height of its development; the Pacific era, destined to be the greatest, is just at the dawn."

Another famous quotation is that of William H. Seward, when he was Secretary of State:—

"The Pacific Ocean, its shores, its islands and the vast region beyond, will become the chief theatre of human activities and events in the world's great hereafter."

What a destiny for the favored ones now living near this golden empire!

How necessary that all community sales efforts be directed along engineering lines, honestly exploiting the Pacific Coast as a whole, with whatever special emphasis can legitimately be placed on the superior advantages of any one particular locality.

Selling Demands Experts

Only the highest exponents of the art of selling should be engaged in this important work and where a community cannot see the wisdom of first exploiting the Pacific Coast as a whole, that community should confine itself to purely local efforts. By purporting to enlighten the outside world on Pacific Coast conditions and then resorting to gross misrepresentation as affecting every community but the "favored one," they simply stampede all sales prospects and cloud every issue. Communities must either stay out of the Pacific Coast program or go into it with an avowed purpose to state facts as existing, from Canada to the Mexican border and from the Rocky Mountains to the shores of the Pacific.

Every community on the coast has its proper place in the scheme of things, and each has a superb destiny.

The local problem and the Pacific Coast problem always subject themselves to a final analysis under five broad subdivisions:

1. Supply of capital
2. Supply of labor
3. Supply of raw material
4. Transportation (rail, automobile, river and ocean)
5. Distribution (international, national, Pacific Coast, local).

This is what the investor wants to know about. It is more than community pride that should inspire the telling of the true story of the Pacific Coast—it is a national duty.

Improving the Mountain Playgrounds

Power Company Plants Three Hundred and Fifty Thousand Baby Trout

THE policy of public utility corporations has always been to build up and make better the territory into which their activities have taken them, and particularly is this evidenced in the public domain where the utility corporations, in cooperation with the Federal Government, are making the mountain playgrounds more readily accessible to the public. In the Kings River basin, where the scenic grandeur of mountain and stream rivals those of many of the national parks, the natural beauties and resources are being more fully utilized through the application of engineering knowledge fostered by the men responsible for water power development in this little-known mountain playground.



Loading the trout onto the San Joaquin Company's trucks at Fresno

Into this wonderland substantial roads are being constructed, bridges are being built over its streams, and in utilizing the waste water, beautiful lakes are being formed.

These advantages are being made available to the public through the activities of the San Joaquin Light & Power Corporation which, during the next ten years, plans an expenditure of \$100,000,000, embracing the construction of seven power houses and dams, many miles of road and a number of bridges. An example of this policy of building up the public playgrounds occurred recently when a shipment of 300,000 small trout was transported to suitable distribution points along Kings river by this company. The fish which consisted of Loch Levin, Eastern Brook, Rainbow and Brown trout were from the Sisson hatchery of the California Fish and Game Commission. The consignment which was contained in 125 15-gallon cans was immediately transferred on arrival from a special car to four two-ton auto trucks, manned by ten men, and started on its journey to the end of the wagon road at Balch Camp on the Kings river. The Loch Levin trout were liberated there and the Rainbow and Eastern Brook varieties were reloaded onto a 16-animal pack train and carried to the higher mountains.

Standard Accounting for Municipally Owned Public Utilities

Former President of the State Railroad Commission of California Explains
the Importance of Standard Accounting for Municipally as
well as Privately Owned Utilities

AGITATION in favor of, or against political ownership, that is, municipal, state or governmental ownership of public utilities has occupied a more or less important place in public discussions, in the daily press and current periodicals, and in political and legislative proceedings, during recent years. In the light of impending legislation in California, where it is proposed under an initiative measure, to place the resources of that state under the unsupervised control of a politically appointed Water and Power Board, it would seem that there are several questions which should be answered before the voters can intelligently pass judgment upon this proposal.

Whether municipal or other political ownership of public utilities is economically unsound, as its opponents assert, or whether it is as efficient and economical as its adherents maintain cannot be determined until an adequate basis of comparison, or contrast, of costs of operation is established. No such basis exists today. This is the greatest bone of contention between advocates of both systems, and statements are freely advanced by the proponents of both methods that the system which they choose to uphold is more efficient and that it throws a lesser burden upon the consumer.

Possibility of Concealment

Until the actual facts of municipally owned utilities are ascertained and given to the public so that the public may determine for itself the matter of policy, this uncertainty will exist. The obvious solution is the establishment of a proper and standard accounting system for municipally conducted enterprises which will remove for all time the possibility of concealment or subterfuge in the presentation of facts. Such a system is maintained by all of the privately owned public utilities under the supervision of state regulatory bodies in all of our western states and is open to public inspection.

The Journal of Electricity and Western Industry has announced its belief that the best interests of the West lie in the development of its resources through individual initiative. Before the question can be decided as to which method is the better it believes that the two systems should be placed on an even basis by the establishment of such a standard accounting system.

Edwin O. Edgerton, former president of the State Railroad Commission of California and a leading authority in utility matters, has presented the following views on this subject.

"Sound and accurate accounting is an essential in the successful conduct of any business whether it be public or private. It is manifestly impossible to make proper judgments unless those in responsible

charge have accurate information as to the precise condition of the business.

"Imagine the folly of determining whether or not to expand or contract an existing business activity with no accurate knowledge of the financial condition of the enterprise.

"When a municipality enters into business such as the ownership and operation of a public utility service precisely the same reasons exist for exact knowledge of conditions as do in the conduct of any private business.

"Not only is it essential that those in responsible charge of the conduct of a municipal enterprise be fully and accurately informed; but it is also essential that the people of the community have an opportunity, before acting upon proposals, to have the facts. The only method of ascertaining and presenting the facts is through an accurate accounting system.

"Inasmuch as judgments of a given business condition are formed by way of contrast and comparison it is necessary that a standard and uniform system of accounting be established whereby each community must keep its accounts according to an established recognized standard. Only in this way will comparisons be possible.

"It has been said that one of the greatest accomplishments of state regulation of public utilities has been the establishment of a uniform accounting system, so that the public has the assurance that all items are cared for in the same way by all of the public utilities, thus making comparison and check feasible.

"In any state of the Union today under regulation it is possible to check the financial operations of one public utility against another and to at all times compel an accurate and honest accounting through these standard systems of accounts.

"But there is no such system in existence today in most of the states with relation to publicly owned utility enterprises.

Statements Are Challenged

"The result is that in practically every instance where an assertion is made by the proponents of public ownership that a given municipal enterprise is highly profitable, efficient and successful, the statement is promptly challenged on the score that the accounting system permits of a successful concealment of at least a part of the cost of operation with the result that a false statement of conditions is given to the public.

"One very important feature of this lack of certainty as to the financial effect of municipal ownership and operation of a public utility service is

that the citizen cannot adequately contrast the results of public and private ownership and operation.

"He can on the one hand obtain a very minute statement of the results of private operation because the state regulating authority has in its possession, as a result of uniform standard accounting, complete records of the financial operations of the companies, but on the other hand he cannot obtain such information as to the operation of his own publicly owned utility. He must rely upon the partisan statements of those who are operating the publicly owned utility service and because of the lack of proper accounting these statements are frequently erroneous and are not to be contrasted with the statements of the privately owned utilities.

Low Rates Cited

"It is a common practice to confront the citizen with a comparison of rates charged, and where the publicly owned utility rates are lower than those of the private company, to seek to impress the citizen that this is complete proof of the less costly and more efficient operation of the publicly owned utility. To those who know this is utterly fallacious, as it may well be and undoubtedly is true, that in many instances a part of the cost of the operation of a publicly owned utility is not charged in the rates but is taken from taxes either directly or through the method of having various departments of government contribute to the operation of the utility with no charge against the service, the result being that the public rates do not reflect the actual overhead cost.

"There are instances in California where practically no overhead charge whatever is made against the publicly owned utility service and the entire overhead is carried by the citizens through taxation, and yet these same citizens are told that they are receiving a service at a cost reflected in the low public rates and which is profitable to the community.

"I am not here arguing for or against the policy of obtaining the cost of producing the publicly owned utility service out of taxation but I do insist that the actual facts of publicly owned utility operations be ascertained and given to the public so that the public may determine for itself the matter of policy.

"Furthermore, it is bad policy to permit officials to conceal the facts from the public as this leads to abuses on the part of public officials in the conduct of city business.

I should say there is no more dangerous condition in government than one which permits of concealment of the actual facts of the conduct of public business.

Effect of Politics

"Surely no honest public official who asserts that his municipal enterprise is successful should hesitate for a moment to submit to the most rigid test of standard accounting in order that this be ascertained—in fact he should welcome and insist upon such a showing. It would seem that the simple statement of the wisdom and necessity of proper and standard accounting by municipal enterprises should

be sufficiently persuasive and yet we find a very substantial resistance to the establishment of such accounting systems.

"Discarding any question of dishonesty, this can only be accounted for by the extremely partisan and controversial attitude on the part of those who are conducting a municipally owned public utility service. Apparently in the fear that if the actual facts are frankly stated to the public, advantage will be taken by the enemies of public ownership to injure the enterprise, resort is had to concealment and subterfuge. It would seem to be a perfectly logical, reasonable and sound proposal that the state through some agency which is skillful in this matter (such as the utility commission) should establish a standard system of accounting to which all municipalities must conform in the conduct of a public utility service, and further that at all times inspection be permitted of these public accounts so that the facts may be ascertained.

"In the debates that are now being engaged in and the discussion which is widespread of the relative merits of public ownership as contrasted with private ownership of public utility service, it has frequently and properly been said that the agency which can best do the job for the public is the one which should survive. But it is obvious that a determination to be sound must be based on the facts and in the interest of the public every effort should be made so that the facts can be accurately determined and publicly stated in order that citizens may come to an informed judgment."

In addition to pointing out the advisability of instituting a uniform accounting system for publicly owned enterprises, Mr. Edgerton has said, regarding the subjection of this type of enterprise to the same rigid supervision in all departments, now borne by private enterprise:

"State regulation of privately owned public utility service having become an accomplished fact and being now looked upon as permanent, discussion is becoming more vigorous and extended as to the wisdom of similar state regulation of municipally owned and operated public utility services. This question, of course, should be determined on its merits, free from all prejudice for or against public ownership.

"What sound objection can be raised to state regulation of municipally owned utilities? If these enterprises are sound, if they are being properly conducted, if they are in every respect successful, then those who are interested in them should welcome the opportunity for complete public exposition before a state commission trained to analyze utility operations and capable of laying down sound rules in the interests of the people. Would it not be a great satisfaction to the people of a city to know that at all times there was a wholly impartial trained body of experts under the guidance of experienced commissioners constantly available to consider complaints and with constant supervision of the activities of those engaged in operating a municipal enterprise?"

The "Dollars and Cents" Standard of Industrial Success

A Second Contribution by Mr. Leurey Explaining How the Lack of Trained Industrial Electrical Engineers in Industry is Costing the Factory Owner Unnecessary Expenditure

By LOUIS F. LEUREY
Electrical Engineer

IN addition to the two common faults mentioned in a previous article, which are direct results of the absence of trained industrial electrical engineers from industrial plants, namely, the lack of comprehensive switchboard and distribution arrangement covering the initial installation, and the haphazard system of specifying electrical equipment for purchase, there is a third and not least-important adverse condition quite prevalent in industry today. The condition, to use good electrical terms, is more negative than positive and the sin is one of omission rather than of commission. The fault lies in not making active the many potential and efficient uses of electricity in industry.

Electricity is employed in modern factories in two principal forms. First, as a motive power, and second as a medium for accomplishing industrial processes. It is principally this second type of usage that is being grossly neglected. When one looks into the present composition of industrial organization it is easy to read the answer to this neglect. Most industries were organized in earlier periods when only the mechanical engineer and the chemist were capable of developing factory processes. As the electrical industry developed the mechanical engineer naturally adopted the motor as only another but a very convenient form of driving power, and up to and including the present time the mechanical engineer has dominated the use of electricity in industrial processes. The electrical industry owes a great debt to mechanical engineering for its assistance and guidance in developing strength and durability in electrical equipment, but all unconsciously the mechanical engineer in the industrial field has been throttling the growth of electricity even to his own disadvantage. In the great field of industrial application of heat, mechanical engineers and industrial chemists have become enthusiastic advocates of electricity once they have been shown its real performance. Too many of them, however, dismiss it with a wave of the hand when they point out that dollar for dollar its heat content is so much less than is contained in the primary fuels, **but the answer is not written in B.t.u.'s but in dollars and cents of completed product** and this is where the function of the industrial electrical engineer is being overlooked in industry.

A glaring example came under the writer's observation where an inadequate conception of the proper uses of electricity was causing the owner a great annual loss not only through lack of the proper extension of electricity but through a still further loss in heat energy throughout the plant. This particular plant was originally steam driven through-

out and the exhaust steam from engines and pumps was used in the factory process. The operating department found that they suffered considerable loss due to a surplus exhaust steam. The idea occurred to them that all they had to do was convert a certain percentage of the drive from steam to electricity. This was done accordingly; electricity was purchased from the local power company to drive the motors and the excess of exhaust steam promptly disappeared.

However, the high annual cost for power instead of disappearing, promptly proceeded to increase. The problem was finally solved by doing what the situation obviously called for, that was, to get rid of all of the mechanical prime movers that were "steam hogs" and to lay plans for an ultimate complete electrification, the energy for the motors being supplied from a large generator whose efficient prime mover supplied, without excess, the exhaust steam needed for the factory process. Due to the fact that the initial electrical layout contemplated no extension and due to a pitiable mess of inadequate wiring this entire job had to be done over with only the motors and starters remaining as salvage.

Influence of the Inspection Agencies

This summary of conditions surrounding the industrial applications of electricity would be incomplete and misleading if it did not exemplify the influence of the National Electric Code and the various safety bureaus. For a long period the National Electrical Code was the largest single influence to bring order out of chaos in the industrial application of electricity, and wherever its limited forces could reach, the owner was guaranteed at least that his initial installation was safe from fire hazard and adequate in electrical capacity as far as each single piece of equipment was concerned. Based on this knowledge many owners, not unnaturally be it said, assumed that a code job was necessarily a good job. The fallacy appeared in the fact that the code did not and could not cover the economic side of the question, so that many perfectly good code jobs were economically wrong in that they contained misapplications of equipment, inadequate provisions for extensions, or else indefensible frozen investment in oversized equipment.

In the state of California in 1917 the national code was supplemented by another regulatory body, namely, the Industrial Accident Commission. The electrical division of this commission promulgated orders, instituted an inspection service, but most effective of all adopted a missionary program which preached the doctrine of accident prevention to all branches of the electrical industry, and to the public

at a whole, so effectively that in the brief space of five years its influence can be seen throughout that state to an almost unbelievable degree. In addition to the badly needed improvement in safety conditions a better continuity of operations in factory processes has followed. In addition electrical contractors and mechanics generally have acquired a passion for neatness and finished workmanship that was formerly conspicuous by its absence. Like any movement that catches the imagination it has led to some fearful and wonderful individual efforts. The writer viewed one such effort where the array of "tinware" would have caused a sheet metal workers' convention to burst spontaneously into song. The influence, however, has been overwhelmingly for the advancement of the industry, and its limitation has been the same limitation that was imposed upon the code in that it did not and could not touch the economic problems of electrical application.

Point of View of the Owner

To those who have not the benefit of a diversified experience in industrial work it might seem that the foregoing paragraphs describe only the isolated conditions that obtain in poorly managed properties and that surely it cannot be indicative of conditions that exist in the majority of plants. How, they might reason, could such conditions exist where a manager is actively interested in every detail of his property?

In the first place, electricity is practically a new industry and has gone forward with such leaps and bounds that not all members within the industry have kept pace with it, let alone outsiders. Furthermore, much stress has been laid upon its mysterious phases and not enough on the utter simplicity with which it functions and the certainty with which it obeys the natural laws. The resulting effect upon the factory manager has been that he assumes that he cannot understand electricity, and if asked the simplest question about electricity in his factory, he will usually refer you to his electrician. Question that same owner about the process, or mechanical equipment in his factory and he will be able to give you a very accurate account of its efficiency and performance. The owner understands thoroughly what his steam is costing him because it is based on familiar units such as barrels of oil and dollars per month of labor; but, he accepts with undisguised dissatisfaction a bill which tells him that he is paying a sliding rate "based on the first 60 kw-hr. of consumption of each horsepower of demand."

Don't imagine for an instant that the average owner is not interested in electrical applications. In fact he is vitally interested. As one owner put it to the writer: "I felt for a long time that something was not right with the electricity in this factory but I could never put my finger on it." This same man had "put his finger" on many sore spots in his machinery and process work but in the case of his electrical usage he had not been educated to the point where he felt confident enough to exercise his own opinions.

In the second place, due largely to the traditions

of an earlier period in the history of electricity, the factory owner is convinced that it suffers from certain inherent weakness and he is prepared to accept from it a quality of service that he would not tolerate from any other agency. He feels that feeders must necessarily "kick out" and motors "burn out" every so often and rarely concerns himself with whether the cause was preventable or not. He knows of the wonderful flexibility of electricity, and other good qualities that lead him to condone what is often a perfectly inexcusable error in application and operation. It can be readily seen how this point of view is strengthened by the actions of his own operating department or the action of men in other branches of the electrical industry who have not the courage to admit that the weakness is not inherent in electricity but is mainly in the haphazard methods of its applications and use. Many owners seem to feel that electricity is still in its pioneer period (and in the larger sense this is true) but as far as its applications to industry are concerned it is an exceedingly simple and dependable form of energy.

In the third place, the owner's viewpoint has been disturbed by unfortunate circumstances that bring him into improper contact with the electrical industry through the medium of destructive salesmanship. In this category can be included all those sins of omission and commission both conscious and unconscious by which the initiative of the owner is broken down, so that instead of actively cooperating in the purchase of his equipment he is told what to put in.

Taking advantage of the owner's declared lack of knowledge and his known lack of adequate advice, too many individuals and companies have elected to "push a line" rather than to "sell a service." Men representing specialties have magnified the importance of this device or that device to such an extent that owners have spent more time studying push buttons than they have motors. If the selection of each of these minute devices that make up the electrical network called for such painful thoughts, no wonder the owner threw up his hands and said, "Electricity is too much for me." This constant cross-fire of contending claims on every individual device that enters the broad field of electrical applications in industry has resulted in a great majority of the owners in desperation casting themselves into one of the two groups mentioned in an earlier paragraph, that is, they buy everything possible from a single house or they gradually accumulate an electrical Noah's ark.

It can be readily seen that the viewpoint of the owner as outlined in the above paragraphs is not one that promotes and achieves a completely successful electrical installation. It explains how even in a well managed industry the electrical equipment is not a thing to be proud of even though it does "live through" by virtue of its inherent ability to function even when mishandled, and it further explains how this adverse point of view is largely due to the improper contact between the electrical industry as a whole and the owner.

New Business for the Contractor in Fire Alarm Systems

The Installation of Adequate and Modern Fire Alarm Systems, Especially in Small Towns, Offers Good Opportunity for Study and Profit on the Part of Progressive Contractors

By E. R. MURRAY.

Supply Specialist, Western Electric Co., San Francisco

FIRE alarm systems for industrial plants, schools, hotels, factories, theaters, public institutions and small towns comprise a very extensive field for specialization and study on the part of the progressive electrical contractor-dealer; and in order to be of the utmost service to his community, he should look into such possibilities within the field adjacent to his place of business, bearing in mind that it is his particular office to invite inquiries and discussion on the subject. By a little direct-by-mail advertising, or by personal canvass, it becomes a simple matter for the contractor-dealer to identify himself as an expert in this branch of electrical work, and this procedure will uncover the most unexpected results in the way of prospects and actual contracts. Many merchants and factory owners would welcome information and suggestions concerning more adequate or more up-to-date fire alarm equipment, and no one is better fitted than the contractor-dealer to perform this function.

It is highly important that the situation be analyzed and that the correct fire alarm system be installed. A system which is too complicated, or elaborate for the needs, becomes a dangerous nuisance and very often a costly one. The simpler the system the more ideal and positive it is, but this does not mean that comprehensiveness and detail should be sacrificed for the sake of slight additional cost or for the efficacy of performance under emergency. Before taking up some of these systems in particular it may be well to offer a few suggestions and remarks concerning the general field of fire alarms.

Different Alarm Systems

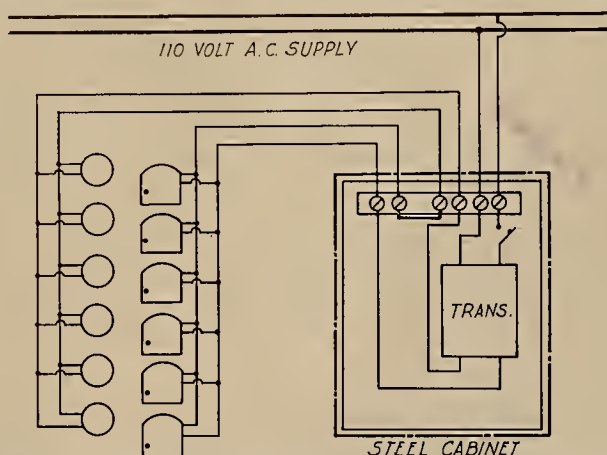
For factories, warehouses, industrials, freight terminals, the straight closed circuit system is recommended, employing electro-mechanical bells and mechanical boxes, for the reason that the system is always under test, and any break in the lines would cause a single stroke on all the bells, and also ring the trouble bell in the central station. This system might also be considered for schools which are so small that they do not maintain a principal or where there is not some person in charge at all times, located at a central point.

For larger schools, maintaining principal with staff, colleges, public institutions, hotels and theaters, either a double closed circuit system or a centrally controlled open circuit system is recommended. The double closed circuit system or the "pre-signal" system, is one which is so designed that should a box be pulled it would result in ringing 1, 2, or 3 bells only, located at central points. For example, in a large hotel, the first alarm would ring a large

bell in the office, one in the engine room, and possibly one in the engineer's quarters. This would call the fire brigade (there usually being a trained brigade in all buildings of this kind), which would proceed immediately to the point indicated. Should the fire be of such proportions that the brigade cannot cope with it, and it become necessary that the guests be alarmed, a second operation of the box by any member of the brigade will sound a general alarm on all the gongs in the building, thus informing all the occupants of the fire. This system is a fully closed circuit system and the entire wiring and apparatus are under test at all times.

Centrally Controlled System

The centrally controlled open circuit alarm system, employing either single stroke or preferably vibrating bells, would consist of an annunciator at the central point, common break-glass boxes throughout the building, and a set of vibrating bells sufficient in size and number for the purpose, located



Design of an alarm system suitable for a warehouse having 110-v. alternating current, where house current may be used for operating the gongs. This is an open circuit system, and when the lever is pulled, repeats the alarm four times. This type has the advantage of low initial and upkeep cost, but is not under electrical supervision and there is no indication whether the system is inoperative.

at proper points. Bells are usually mounted directly above the alarm boxes or stations. Upon the breaking of the glass at any station, it would cause the number of that station to indicate on the annunciator at the central point, cause the annunciator bell to ring continuously, and where desirable to have extension of bells, it would also cause the extension bells to ring continuously. It would then be within the power of the person at the central point to operate, by means of small switches at the bottom of the annunciator, or at close range, any or all the bells to alarm occupants and clear the building.

It has not been considered good practice to install in public institutions, hotels, or theaters, a sys-

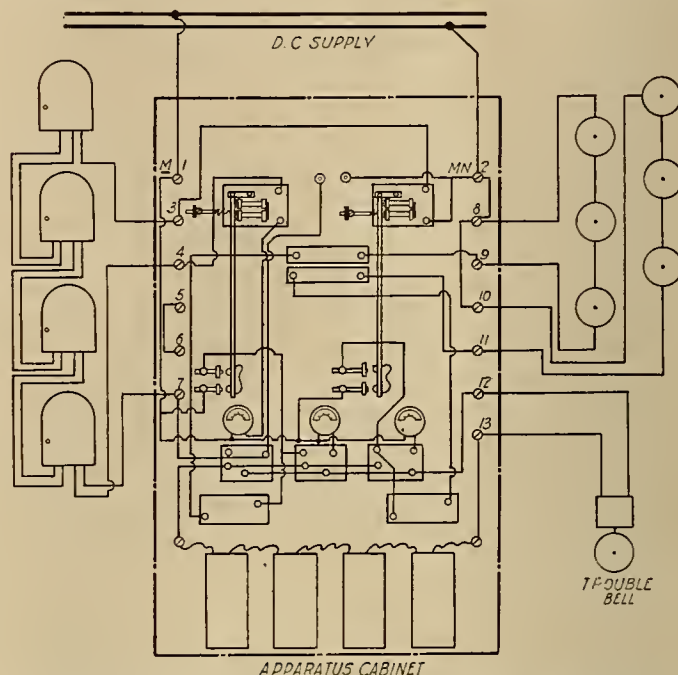
tem in which the operation of a box would ring all the bells and alarm the entire building, as many alarms are false, and the emptying of such buildings would cause great inconvenience and might be attended with serious results. In smaller hotels, however, where there is no night staff, there is no alternative, and the general alarm must be sounded. In theaters and department stores the question of panic is one which must be carefully considered. In the theater, a system which will sound bells not too large in size, on the stage, under the stage, in the fly gallery, in the office; as well as the displaying of lamps of either special coloring or grouping, in the auditorium itself, in order to convey the information to the ushers and employees who are supposed to attend to the exits, has been considered the best system to meet the conditions.

Department Store Systems

There is some difference of opinion concerning the most suitable system for department stores. If a system employing single stroke bells is used, a closed circuit system is recommended. Bells should not be too large in size, but sufficient in volume of sound to warn the employees. The alarm alone is inadequate. There should be a well planned and practiced fire drill, so that all the employees can act as ushers, and lead the patrons to the nearest exit. The alarm system should be supplemented by exit signs which would be illuminated when an alarm was turned in; these signs to be fed from some source other than the building plant. A relay in the alarm line would immediately illuminate the signs when the general alarm is sounded. Electro-mechanical bells or single stroke gongs are considered superior to vibrating type for fire alarm work. As it has been general practice for many years to use the electro-mechanical and single stroke gongs for fire alarm purposes, they have come to be recognized as a fire signal, and it is easier to distinguish the alarm, especially in buildings where a large number of vibrating gongs are used for various signal purposes.

Regarding batteries, fire prevention authorities seem to agree that wet batteries, such as the Edison type, with transparent jars, are to be preferred. This type of battery works most efficiently on closed circuit. Dry cells should never be considered for fire alarm circuits except on a "trouble bell" circuit, and these should be tested periodically. A milliammeter should be in the wet battery circuit to indicate the condition of the battery at all times. If this is not done the batteries may run to such a low amperage that the relays will release and cause a false alarm. A periodical inspection of the milliammeter will prevent this. Storage batteries may be used, but only in places where they will receive attention by some one who is familiar with their operation and maintenance. A great deal of care should be exercised in installing sufficient battery; that is, to furnish sufficient ampere capacity so that the drain will not be excessive, necessitating the renewal of the elements too frequently. It will be found economical, in most cases, to install two sets

of cells in multiple-series, thereby increasing the life of the battery approximately two times. The number of cells in series should be sufficient to give the required voltage to overcome the line and relay resistance, and the correct number of cells must be determined for each particular installation. This battery question is the most important item in any alarm system, and nearly all cases of subsequent trouble can be traced to the neglect of proper battery provision at the time of installation. In all



Wiring diagram of a pre-signal electrically-supervised closed-circuit code-ringing system, suitable for hotels or apartment houses. It derives current from a storage battery, but may be equipped to use 110-v. direct current from a lighting circuit. There is a constant flow of current through the bells and pull boxes, but not enough to operate the system. When a box is pulled the resistance in the circuit is cut out and the gongs are connected directly across the 110-v. mains, during the instant the box circuit is open. By a separate make-and-break system for each box, a code is established, the mechanism alternately opening and closing the circuit.

cases it is safest to secure battery recommendations from the manufacturers of the apparatus or from their representatives. Relays are wound to different resistances for performing various functions, and it is highly important that they receive the right amount of current and no more. This is especially true in a circuit where more than one relay is functioning—the one dependent on the other. Therefore, it follows that the manufacturers are best fitted to make battery recommendations, and these should be strictly adhered to in order that correct results may be obtained.

While there are several systems suitable for small towns, each having its particular advantage and mode of operation, a model system would cost about \$3400 and embody all of the desirable features of town protection. The system recommended is a closed circuit and electrically supervised, and would operate somewhat as follows. When a box is pulled a coded signal is given on the gongs at the central station, the number is registered and an electric siren sounds the code of the box pulled. When one box is pulled the operation of another box will not interfere, but will sound in succession, a jumbled signal being impossible.

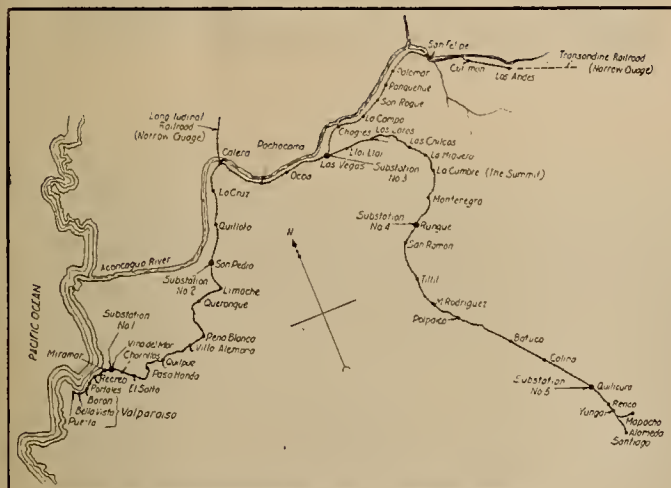
Chilean State Railways are Electrified

Details of Electrification of 134-Mile Stretch
for Which Orders Have Been Placed
in the United States

THE largest and most comprehensive single order for electrification equipment ever received in the United States was that recently placed by the Chilean government with the Westinghouse International Company.

The total railroad mileage of Chile is 5,200, of which about 30 per cent is privately owned, mainly for mining and industrial enterprises. The remainder of the mileage is divided into two general classes, the broad gage lines and the narrow gage lines.

The conditions that arose during the recent World War brought very forcibly to the attention of the railroad management the necessity for electrifying the broad gage lines, especially the Valparaíso-Santiago line with the Los Andes branch, where traffic was rapidly approaching the track capacity.



Map of the first zone to be electrified

In addition, fuel costs were excessive while the almost limitless water power was going to waste.

Study of Existing Electrifications

In 1918 a commission was appointed to study the problem of electrifying the broad gage lines. This commission, consisting of Rafel S. Edwards and Ricardo P. Solar, made a careful analysis of electrifications all over the world. As a result of the possible economies shown in the report of this commission, it was decided immediately to electrify the broad gage lines beginning with the Valparaíso-Santiago and Los Andes branches, or the first zone. A loan of \$10,500,000 for this purpose was authorized and was heavily over-subscribed a few hours after offering.

144 Miles in Initial Electrification

The initial electrification will include 116 miles from Valparaíso to Santiago, and 28 miles from Los Vegas to Los Andes. The maximum grade in this zone is 2.25 per cent, encountered in approaching La Cumbre (the summit) from the west. The line contains a relatively large number of curves, the maximum being 10 degrees. The track gage is 5 feet 6 inches. There are six tunnels on the main

line, the longest, the San Pedro, being 1600 feet in length.

The 3000-volt direct-current system was decided upon as best suited to the conditions. Hydroelectric power will be generated at the Maitines Station of the Chilean Electric Tramway & Light Co., Ltd. This station is already under construction and will utilize the waters of the Rio Colorado. The station



A 13-car passenger train on the Chilean state railways

will contain three 8125-kva. Westinghouse generators and will have an ultimate capacity of 30,000 kw. This power will be transmitted 37 miles to Santiago by twin circuit 110,000-volt transmission lines and will be generated at 50 cycles, 3-phase. These transmission lines will be connected at Santiago with the system fed by the Florida hydroelectric station and the Mapocho steam station, both of which were constructed some years ago by the Germans and were designed for 50-cycle, 3-phase power. The total capacity of the three generating systems at present proposed will be, when completed, approximately 120,000 kw.

Substations Provide for Traffic Expansion

The power supply will be distributed by five substations designed to handle a train movement that is approximately 50 per cent greater than that existing in 1917, with a further provision for tripling the 1917 demands, if necessary. Each station will initially contain two Westinghouse 2000-kw. motor generator sets, each set consisting of a 2800-hp. driving motor, and two 1000-kw., 1500-volt generators connected in series. These sets will be designed to withstand a 200 per cent overload for five minutes without injury, and as an additional safeguard a flash suppressor will be included.

Contract Includes 39 Locomotives

Thirty-nine electric locomotives are required for the initial electrification, including 6 express passenger, 11 local passenger, 15 road freight and 7 switching locomotives.

The express passenger and road freight locomotives will be equipped with regenerative braking, in its most modern development. The service in which the local passenger locomotives will operate will not require or justify the regenerative braking feature.

The fact that this contract includes only the first railroad zone indicates the magnitude of the electrification project which Chile has undertaken.

Business Districts of Western Metropolitan Centers

One of a Pictorial Series Featuring Interesting Applications of Electric Service,
Advances in Home, Industrial and Power Construction and Noteworthy
Developments in Western Progress



A bird's-eye view of the business district of Portland. This enterprising western city is planning a world's fair in 1925.



Looking north at the business district of Seattle, busy metropolis of the Pacific Northwest, from the 42-story L. C. Smith Building.



A panoramic view of the business section of Salt Lake City is imposing as viewed from the City and County Building.



Market Street, San Francisco, the main artery of traffic in the city by the Golden Gate, looking toward the Ferry Building from the retail shopping district.



Hastings Street, Vancouver, which is the center of commercial activity for the west coast of Canada. The new rule of the road will be inaugurated with the new year.



West Seventh Street, Los Angeles, in the retail shopping district. This city has been rapidly forging ahead in industrial growth, especially in building records.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

INTRODUCTION

Salesmanship is the art of persuading people to acquire the things which the salesman wants to sell. Efficient salesmanship is the art of achieving this by the use of methods which consume the least time and effort on the part of the salesman.

There is no magic, no mystery of any sort to efficient salesmanship. No salesman can sell every time he tries; but an efficient one will succeed more frequently than an inefficient one. This difference is entirely due to the fact that the efficient salesman has trained himself into using consistently certain ways and methods which can be readily acquired by anyone who has patience enough, and persistence enough, and common sense enough to think intelligently; to study constantly, and to work hard. Without a firm resolve to practice these three things, and without sufficient will-power to do so all the time self improvement is practically impossible.

There is one more thing about self-improvement, which we all know perfectly well, but which the business man never remembers, whereas the athlete not only uses it systematically but even bases his whole training upon it. I refer to the impossibility of measuring, or even definitely noticing, self-improvement unless there be used some record of performance against which we can measure or scale all subsequent performances.

Now, efficient salesmanship results from a systematic cultivation of a number of things that help in selling, and in the systematic suppression of a number of others which handicap in selling; how can anybody be assured that he is improving himself in salesmanship unless he prepares for himself a schedule of these various points, and records his "performance" from time to time and point by point on such a schedule?

Such schedules are an essential implement or tool of everyone who wants to grow and improve. Otherwise he cannot ascertain his weak points and will always have a tendency to lay the greatest stress on those of his characteristics and abilities which are well developed, and to fool himself into slighting his weaknesses.

As a matter of fact, this general rule can be laid down for the kind of every-day work we are all engaged in:

Steady growth and improvement comes not from adding to our strengths, but from decreasing our weaknesses.

As a chain consists of a number of separate small links, so salesmanship is built up of a number of separate elements. And just as the strength of a chain is determined entirely by its weakest link, so the effectiveness of a salesman is limited by those elements of his art in which he is weakest.

The elements of salesmanship are all extremely simple. They are all built up from every-day experiences of every-day people. None of these elements require any special knowledge or preparation—nothing but common sense and systematic attention to business.

The present study course of Self-Improvement in Salesmanship offers in systematic form a schedule of all the vital elements of the art of selling, and indicates why each of these elements has a direct influence on success or failure in making a sale. By a proper, conscientious and unrelenting use of this schedule every salesman can attain a high degree of selling efficiency.

Simply to read through this study course without a systematic use of the offered schedule as a record for self-observation and self-grading will be about as helpful to a salesman as it would be to a sick person to read through the label on the medicine bottle prescribed by the physician.

The Service Principle in Selling

Before going into a detailed discussion of the elements of salesmanship it is necessary to devote attention to the broad moral principle which underlies all efficient selling work in our days.

There was a time—and not so very long ago, either—when all selling was conducted on the basis of: "Let the buyer beware!"

Even our laws recognized this as the basis of all trading, and called this the principle of "caveat emptor." To put it in a very blunt way, this meant substantially that the seller could use every trick of the trade, misrepresentation, cheating, even straight-out lying, to put over his sale; and that any profit which he could get away with under this method of selling was his,—legitimately and morally so.

In the course of the last few decades, under the influence of better education and of a clearer appreciation of the merchant's place in human society, this principle of olden times has been entirely replaced by its exact opposite, the principle of the seller's responsibility for the statements he makes in selling and for the goods he sells.

Today it is taken for granted that the average buyer does not know merchandise as well as the seller, and that the seller's position with regard to the buyer is that of an adviser. And only insofar as the seller renders this advisory service to the buyer in an efficient way—from the buyer's standpoint, of course—does the buyer (and that means the whole community) recognize the right of the seller to be compensated for his work in the form of profit from trading.

Once the idea is firmly grasped that a merchant is entitled to profit only in proportion to the service he renders to his customers—and this idea cannot be very well denied in the face of the unrelenting efforts of modern merchants to build up a high degree of "confidence" on the part of the buying public,—it follows necessarily that the salesman as the merchant's representative and agent, to be successful, must apply exactly the same service principle in his own work.

How to Attain Successful Salesmanship

We can draw the following practical conclusions as to what successful salesmanship is based upon and how it can be attained:

Successful salesmanship is the art of serving people through persuading them, by methods which consume the least time and effort, to purchase things which will give them lasting satisfaction.

Successful salesmanship requires a conscientious and thorough study in detail of every one of the four basic components of a sale, namely.

1. The salesman himself
2. The goods offered for sale
3. The buyers of the goods
4. The process of selling.

Successful salesmanship can be attained only through a systematic effort toward self-improvement by:

1. Perseverance in hard work
2. Training in the use of common sense
3. Habit of constant study
4. Persistent elimination of weaknesses
5. Constant self-checking by points on a schedule of the vital elements of salesmanship, similar to the one given in the present study course.

A woodpecker with ideas on railroad management recently held up an express train between San Francisco and New Orleans. A block signal ahead which suddenly dropped red forced the engineer to stop. After some delay an investigation was made, and it was discovered that a red-headed woodpecker, one of the busy kind that builds its nest in the tops of telegraph poles in the mesquite country had become interested in the signal and had pecked away the lead wire to the track relay post just east of the signal. As the block signals automatically order "stop" when anything happens to the mechanism, the result was highly successful from the woodpecker's point of view.

Commerce Department Aids Exporters

Electrical Equipment Division Strives to Act as Non-Partisan Foreign Sales Department for Electrical Industry

ENDEAVORING to look upon itself as a non-partisan general foreign-sales department for the electrical industry of the United States, the Electrical Equipment Division plans to build up its service on that basis. The scope of its work has been broadly divided into three phases: (1) statistical; (2) foreign standards and practice; (3) sales service.

The statistical service that is being developed consists of world directories of all classes of electrical enterprises, the compilation and maintenance of information concerning leading foreign electrical manufacturers with, if possible, their outputs, and the furnishing of current information regarding the electrical trade of the world.

The work which this division contemplates in regard to foreign standards and practices is the maintenance of complete information regarding electrical practice, standards, and restrictions in the various countries of the world. This data will include both the printed rules and regulations of various foreign markets, and all the available current information concerning the practice and standards in common use.

The sales service which is being rendered American manufacturers consists of several activities. One phase consists in bringing to the attention of manufacturers and exporters of electrical goods the definite inquiries for specific American goods from foreign buyers. Some of these are in the shape of trade opportunities forwarded by American consuls or by the offices of the bureau in foreign countries and consist mainly of inquiries for smaller lines, although apparatus and construction projects are sometimes involved. For the larger work, however, plans and specifications are oftentimes secured through foreign representatives of the Government and are sent directly to those firms which are in a position to bid on the work in question.

One feature of this service is the checking of the translation into English of foreign specifications where the original accompanies the translation submitted by the foreign representative.

Another form of sales service, apparently appreciated very much by manufacturers who have no direct representatives of their own abroad, is the assistance given in establishing connections with local houses in foreign countries. Another feature is a record that is being developed of new important projects that are proposed in various countries. These are followed through from the time that they are first talked of until they are either abandoned or carried out, so that manufacturers may be advised as to the status of specific enterprises on which they may wish to submit bids when they feel certain the project will be carried out. All possible means will be employed to develop the service of the Electrical Division for the specific needs of the industry.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Batteries Reverse Voltage at Low Temperatures

When storage batteries or dry cells are cooled down to 170 degrees below zero Centigrade, the temperature of liquid air, these producers of electricity may reverse their voltage. This is the scientifically startling phenomenon that has been discovered at the Bureau of Standards, Department of Commerce, by two physicists, G. W. Vinal and F. W. Altrup, who were making tests to determine the reliability of batteries at arctic temperatures. So far as is known, this is the first time this phenomenon has been observed.

But while the voltages shown under the sub-arctic temperatures are reversed and remarkably large, no hope is held out that storage batteries can be recharged by the simple method of cooling them to the low temperatures. The currents at these low temperatures are vanishing small, and practically they hardly exist, the tests showed. Just now the battery charging stations need fear no low-temperature competition.

The knowledge of the behavior of cells at low temperature will prove useful in the case of flying at high altitudes where temperatures approach those of the arctic regions.

Electric Welding Prevents Tieup in California Refinery

The importance of having some agency for making quick repairs to indispensable machinery in an industrial plant, whether large or small, was recently demonstrated in a southern California sugar refinery when the entire plant was threatened with a complete tieup for an indefinite period when a gear weighing two tons broke down.

A portable electric welding apparatus, part of the plant equipment, however, made the necessary repair between noon of the day on which the fracture occurred and the following morning. The important function which electric welding performs is being demonstrated in many other cases.

A railroad bascule lift bridge at Long Beach is being repaired with such an outfit. The gear rack to which the strains during raising and lowering are transmitted is being welded to its supporting base because the previous rivet fastenings would shear and work loose.

Electric welding received much favorable publicity and attention during the world war. Especially was this true in connection with the repair work on the interned vessels which had been maliciously damaged in the belief that a broken valve chest would require an entirely new cylinder casting.

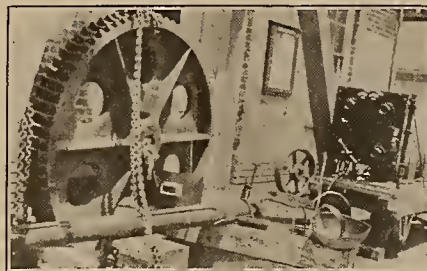
THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

Many other important working mechanisms were thought impossible of repair. Had this been true the replacement would have been a matter of months or a year to clean up the damage. Due to the inherent characteristics of the electric weld different parts were welded in place without the necessity of pre-heating or the stripping of parts that other forms of welding require. Then too, the danger of warping or cracking is minimized by this form of weld. The repair work on the ships was quickly and economically done and the knowledge so gained is serving a useful purpose in the industry of the country today. Particularly in the West where the manufacturing centers are far removed from the oil fields, or the mines and quarries, electric welding is fast becoming recognized for its superiority over any other method. The advent of electric welding in the western industrial field is taking place so quietly that many who should call on this new branch of the electrical industry fail to do so through ignorance of its usefulness and economy. As a consequence much machinery finds its way into junk piles and contributes to the waste in industry.

C. K. CHAPMAN.

Los Angeles.



The breaking down of this two-ton gear threatened to tie up a southern California sugar refinery indefinitely. It was repaired in the plant yard in eighteen hours with a portable electric welding set.

Protecting Mine Trolley Wires to Prevent Accidents

Trolley lines used in connection with electric haulage in mines are a source of danger, and many lives have been lost by men accidentally coming in contact with the wires. Usually the wires in metal mines are sufficiently guarded to prevent men from touching them with their person or by pieces of steel which they may be carrying on their shoulders while walking along the level. However, it is difficult to guard effectively the wires at loading chutes along the haulageways, and despite safeguards, chute trammers have been electrocuted through loading bars that accidentally touched the trolley line.

To overcome this danger, the Calumet & Arizona Mining Co. formerly used a hinged V-shaped trough made of 1-in. x 6-in. lumber, that was dropped over the wire in front of the chute, when the cars were being loaded. This arrangement interfered with the easy operation of the chute, and a cutout device for the trolley line was devised. This cutout is efficient, easily constructed, and does not interfere with the operations at the chutes or with the motors.

When the cutout is open the electric current is carried past the gap by an insulated wire on the opposite side of the drift. A hinged board drops down over the ends of the trolley guard when the slide is open and prevents anything from touching the live wires.

The cutout is simple in construction and consists essentially of a section of ¼-in. rod that slides back into a 6-ft. length of ½-in. pipe, both of which are a part of the trolley line. When closed, one end of the rod remains in the long pipe, at the set back of the chute, and the other end fits into a 6-in. length of the set ahead, and both ends have enough bearing to make proper electrical contact. Standard electric equipment is used in the mine, and as the trolley-wire hangers will not fit the ½-in. pipe, a ¼-in. rod is welded on top for clamping it in place. The motors run past the cutouts with no interference.

When the cutout is closed, it is guarded by two ½-in. x 6-in. boards, as elsewhere. The free end of the rod and guard boards are fastened together by an open rectangular piece of ½-in. x 3-in. iron. The trolley rod is hung from the top of the iron by insulated hangers, and the guard boards are bolted to the sides. The boards slide back in brackets outside of the regular guards. Occasionally, in wet places, enough current leaks through the insulators to the boards of the cutout to shock a man, and to prevent this, insulated knobs are placed on both guard boards for handling.



Electricity has been profitably used in southern California for raising young turkeys. By using electrically heated brooders on the ranch of Peter B. Kyne in the Perris Valley, the mortality rate was cut to 32 per cent, a very low figure.

Electricity Used in Raising Turkeys in California

It may be a far cry from your Christmas turkey to electricity but in southern California it has been demonstrated that the two are profitably inter-related. At the ranch of the California Hotel Farm Company and the Sierra Vista Ranch, owned by Peter B. Kyne, noted California author, in the Perris Valley, electrically heated brooders are used for raising both chickens and turkeys.

Figures for the latter ranch, which is managed by O. H. Cash, show the economy of this type of installation as well as the profits to be derived by the rancher. A year ago Mr. Cash built a brooder house and runway to accommodate 2500 turkey chicks. The house was equipped with four electrically heated hovers, the heating unit of which was an all-steel coil underneath the top and near the outer edge of the hovers. Heating was thermostatically controlled and in addition a no voltage and low temperature alarm was installed. Twenty-two day-old turkey chicks were placed in the brooder house in March and fifteen hundred were marketed for the holiday trade. This is equivalent to a mortality rate of approximately 32

per cent, a very low figure for turkeys.

The amount of electricity used for lighting the runways and heating the brooders was 2737 kw-hr., equivalent to a cost of \$165.68 for the entire season. The cost per turkey was approximately eleven cents.

At no time during the hovering period did the young turkeys suffer from cold, although at times the out-of-door temperature was as low as twenty degrees Fahrenheit. A temperature of 93 degrees could be maintained in the brooder at all times.

The Sierra Vista owners are so well pleased with the results obtained from the installation that they expect to increase the size of the plant next year to accommodate 7500 chicks.

Electricity is also used in adding to the production of the rancher in the case of lighting chicken houses and runways. During the late fall, winter and early spring months electric lights are used to awaken the hens long before daybreak and induce them to work overtime. This practice was first started at Arlington, near Riverside, and has been generally adopted by poultrymen. It is claimed that this procedure greatly increases the egg output.

E. B. CRIDDLE, General Agent.
Southern Sierras Power Co.

(2) the present washeries are inefficient, the washed coal containing avoidable impurities, and the refuse containing an excessive proportion of good coal. Proper adjustment of the washers not only improved the quality of the washed coal but also greatly reduced the loss of good coal in the refuse; (3) by rearranging present flow sheets and replacing many old machines now in use with improved coal-washing equipment, the practice at each plant could be greatly improved.

Since the completion of these studies, two coal companies have remodeled their plants and another company has started work on a new plant to replace its present one. Based largely on results of experiments by the Bureau of Mines, one mine is building a table-washing plant to treat a pile of refuse amounting to more than 1,000,000 tons, estimated to contain approximately 200,000 tons of recoverable coal of coking quality.

Tests of the froth-flotation process, now widely used in concentrating various ores, showed that clean coal can be separated from ash in material passing a 20-mesh sieve or finer. A great many coals, however, contain bone, or bony coal, in which the carbonaceous matter is so intimately mixed with ash that 200-mesh grinding does not separate them. As the bony coal is not as easily floated as the clean coal, retreating the froth concentrate of coal yields clean coal, the bone forming a "middling." By the use of this method 95 to 98 per cent of the carbonaceous matter in the coal can be recovered in the concentrate and middling, and from 30 to 70 per cent of the ash discarded as tailing.

City of Los Angeles Salvages Old Pipe by Welding

Old two-inch boiler tubes were used by the County of Los Angeles to support wire fencing, forming an effective dike to protect stream banks from erosion by storm waters. The length of pipe was limited by the height of the leads of the small power driver and by the difficulty of driving in the boulder strewn washes. The cut-off pieces and odd lengths that accumulated as the work progressed, served to keep the crews going during a temporary shortage of this material. These pieces, averaging 4 and 10 ft. in length, were welded by an oxy-acetylene outfit.

Two men made 103 welds per 8-hour day, providing 88 lengths, 14.5 ft. long which was sufficient to keep the driving crews going. The welder worked for 50 days and made 5150 welds on 64,000 ft. of pipe at a total cost of \$752.50 or 1.2 ct. per foot. About 20,000 ft. of this pipe would have been almost a complete loss to the county so that this salvage alone covered the cost of the work. The tubing weighed about 1.85 lb. per foot and was bought from the railroads for 7 ct. per foot. The cost of welding was as follows:

	Cost per 8-hr. day.	Per weld. Ct.	Per 100 ft. Ct.
Rental of welding outfit \$	2.00		
Labor—Welder \$6, helper			
\$3.50	9.50	9.2	75.5
Supplies—			
½ tank oxygen	1.75	1.7	13.9
½ tank presto	1.50	1.4	11.9
2 lb. ⅜ in. rods.....	.30	0.3	2.4
Total cost, \$15.05		14.6	\$1.20

Mine Bureau Studies Coal Problems in Northwest

Coal-washing Difficulties of Oregon and Washington Analyzed Through Cooperation of Government and Universities

Since one-fourth of the coal produced in the United States is used in industrial and other power plants and since coal is one of the chief fuels used in steam plants, the U. S. Bureau of mines has been conducting a series of tests on coal-washing problems in Oregon and Washington. In Seattle these tests were carried on at the Northwest Experiment Station in conjunction with the University of Washington, while those in Oregon were made in cooperation with the State Bureau of Mines and Geology.

Representative samples of run-of-mine coal from a number of mines were tested by screening, the float-and-sink method, and laboratory washing equipment, to determine the distribution of ash impurities from the clean coal by washing, and the degree to which the quality of the coal may be improved. At the same mines samples of all washery products were tested by the float-and-sink method to determine the ef-

fectiveness of the washers as cooperating, and possible improvement of their effectiveness by the float-and-sink method of control. Many supplementary laboratory tests were made with an experimental jig and coal-washing table to determine the possibility of improving the quality of the washed coal and decreasing the loss of good coal in the washery refuse, by the use of improved coal-washing methods and equipment.

In cooperation with the mining companies the coal washeries at Issaquah, Grand Ridge, Ravensdale, and Wilkinson, in the state of Washington, and at Beaver Hill, Ore., have been studied. All experimental work, except the supplementary laboratory tests, was done in the plants.

The principal results of the tests show: (1) The raw coal as it comes to the surface contains much bone, shale, and clay, most of which must be removed before the coal is marketable;

Western Dealer, Jobber and Agent

Business building suggestions for the store — Distribution and warehousing methods — Advertising and sales promotion ideas

Misinterpretation of Guarantee Causes Servicing Troubles

Misinterpretation of the manufacturer's guarantee on electrical products is responsible for a large proportion of "come-backs," in the form of servicing troubles, according to an article in a recent number of "Royal Breezes," the house organ of The P. A. Geier Company, which points out that it is a mistake for the salesman to make sweeping statements about the warranty.

Intent wholly upon getting the order, the salesman, when he is asked about the guarantee, often replies, "Why, madam, if this appliance ever gets out of order, all you have to do is to call us up on the telephone, and we will have a man right out to fix it. We guarantee it absolutely."

The customer accepts this at its face value, and then when the small son of the house sticks a carving knife into the motor to see what makes it go, or when a careless servant lets the cleaner fall downstairs, the dealer is expected to make good all damage without quibble or question.

Careful reading of the guarantee would show that the manufacturer promises to be responsible for any defects in material or workmanship—nothing more. No one except the purchaser is accountable for accidents, abuse, neglect, or damage due to tinkering with the appliance. This should be made perfectly clear at the time of the sale, if later misunderstanding is to be avoided. Intelligent use of the guarantee makes for good feeling and better business, but misinterpretation of it is a trouble-breeder.

Questionnaires Aid Company to Learn Salesman's Attitude

As a plan of educating salesmen on the talking points of a certain washing machine, the company evolved a series of questionnaires which were placed in the hands of each salesman and demonstrator to be answered. The company had discovered that misleading statements were being advanced as sales arguments by some of the salesmen and that many of the others were unfamiliar with the advantages of the washing machine. When the answers were submitted, the weak points of the selling arguments could be determined and strengthened.

Included in the list of questions were the following:

1. How is the washing machine oiled?
2. In demonstrating the machine, do you straighten out the clothes in the tub, or do you throw them in any old way?
3. Do you rinse the clothes in hot or cold water?
4. Do you impress on the customer that hot water is the vital thing?
5. What kind of soap do you tell your customers to use?

Merchandising \$30,000 Worth of Electric Lamps

Los Angeles Store of Newbery Electric Corporation Has Record Growth in Lamp Department During Five Years

Merchandising \$30,000 worth of lamps a year is a large order, especially when the number of individual lamps represented by this amount is taken into consideration. Conservatively speaking, the figure represents approximately one hundred thousand lamps. Yet the lamp department of the Los Angeles store of the Newbery Electric Corporation during the past five years has grown from a \$600 annual contract business to a point where the sales for 1921 will run into five figures.

In remodeling the store this fall, \$5000 was expended for a special service and display section for the growing lamp department. This expansion was necessary to handle the store sales alone since the total business is equally divided between counter sales and contracts among mercantile establishments. Special lamp salesmen are constantly acting as illumination advisers, making tests and demonstrations and otherwise assisting the customer in securing the best possible lighting service. Counter sales are filled directly from the shelves while contract and large orders are filled from stock in three hours or less. Sufficient stock is carried at all times to meet emergency demands as well as the normal trade in all types and sizes of lamps.

According to D. D. McFarlane, sales manager, the idea of promptly carrying the store service to the customers seems to be a very important factor in maintaining such a lamp department and contributes largely toward the increase in contract business which they have shown from year to year.

The records of sales to merchants prove that better standards of illumination are being introduced. One of the reasons given for this is that more careful buying on the part of the public has meant a keener competition among merchants, with better lighting used as one of the attractions to bring trade to the stores. Intensive sales efforts in calling the attention of merchants to the new 25-watt blue lamp for outdoor display lighting has been one of the chief business builders for the Newbery store. Similar campaigns have tended to popularize each new development.

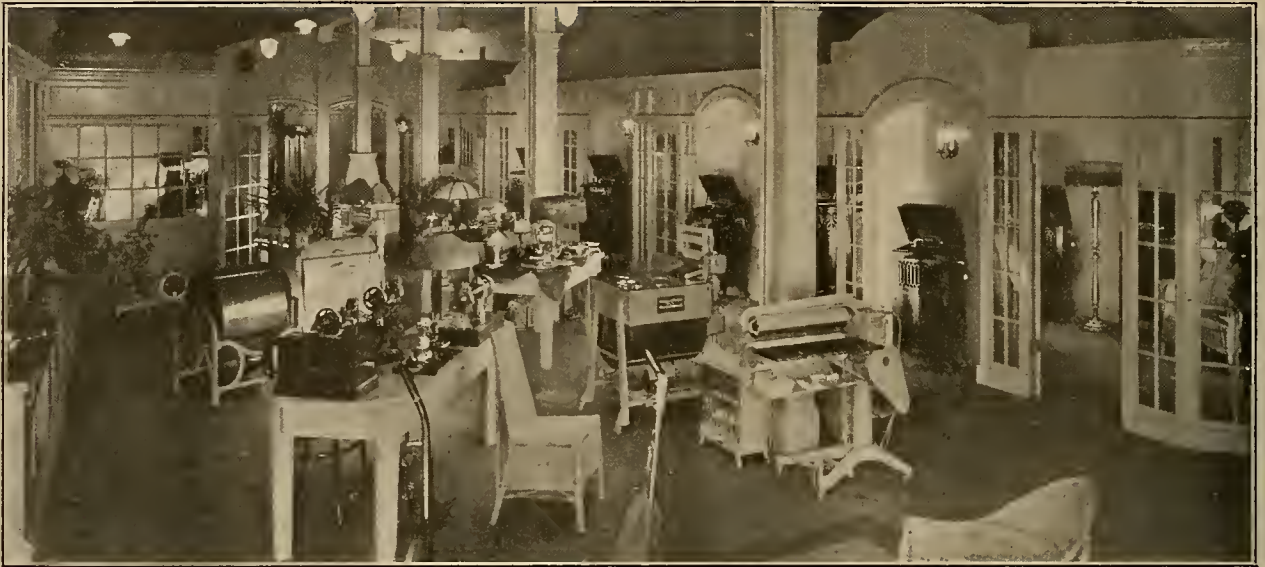
The growth of the lamp department of this store to a point where it represents such a volume of business is but an example of what high pressure effort will do to increase business. Specialization on one line of merchandise in addition to the regular trade is as applicable to the contractor-dealer as is specialization in education in this era of experts.



One of the window displays used by the Los Angeles store of the Newbery Electric Corporation which aided in setting the record of lamp sales amounting to \$30,000 during the past year.

Western Contractor-Dealers Progress During the Year

Past Twelve Months Featured by the Opening of New Establishments in Principal Western Cities, which Demonstrate the Increasing Popularity of Electrical Appliances



The above illustration shows the San Francisco store of the F. E. Newbery Electric Co. where appliances and phonographs are merchandised.



Below is the new store of the C. P. Scott Electric Co., Portland, one of the progressive contractor-dealer establishments in Oregon.



The picture on the left shows the F. A. Clarke Good House-keeping Shop, an appliance store in the highest rental district in Los Angeles.



Below is depicted the imposing front of the new Denver store of Cahn-Poster, successful Inter-mountain district contractor-dealers.



Salt Lake Store Uses Wheel of Fortune in Window Display

Capitalizing upon that trait of nature which urges man to take a chance, the Walker Electric Company, Salt Lake City, recently installed a novel window display, the popularity of which kept large crowds constantly in front of the store.

J. S. Walker, Jr., originated an electrically propelled "wheel of fortune" which was operated by a foot treadle placed on the sidewalk in front of the store. The wheel consisted of a large



Window display of the Walker Electric Company, Salt Lake City, which consisted of a "wheel of fortune" operated from the outside. An appliance was given free of charge to any person spelling its name on the wheel.

disc with the letters of the alphabet printed around its edge. The pointer was a large wooden arrow, spun by the foot treadle, which came to a stop at one of the letters. A large card in the window invited the passer-by to try his luck in attempting to spell the name of some one of the electric appliances displayed in the window. If he was lucky enough to spell the name of a device, it was given to him free of charge.

The element of chance connected with the display not only attracted large crowds but emphasized the various appliances shown in the window. At the same time, it was instrumental in building up good will.

The feasibility of conducting an electric appliance store in a large public market has been demonstrated in Los Angeles by E. Pierson Tyler of Los Angeles. When the new California Public Market opened last spring, he reserved a small space for display purposes. In conjunction with this he directed an aggressive house-to-house campaign. Recently he leased four times the original space in the market and on December 12 opened a holiday sales campaign in a completely equipped kitchen, breakfast room and living room, furnished with every conceivable convenience for the housewife in the way of electrical appliances.

It takes a skillful salesman to talk free service to an intelligent customer without violating any of the principles of good salesmanship.

Sales Letters Are Real Business Getting Mediums

Denver Gas and Electric Company Secures New Business Through Original and Forceful Personal Letters to Prospects

By JOHN T. BARTLETT
Boulder, Colo.

As merchandising aids for the electrical contractor and dealer, sales letters possess several special virtues. They are more personal than the publication advertisement—each individual letter goes from the contractor or dealer to a single addressed person, in the privacy of an envelope. They enable the user, because he can prepare a careful list, to concentrate on just the type of prospects he wishes to, thus reducing selling expense while increasing results. They are flexible, because they can be prepared and put into the mails on only a few hours' notice.

It is, however, as easy to waste money on sales letters as on any other kind of selling effort. The list must be a good one. Then the sales idea must stand scrutiny as something which genuinely contains appeal. Finally, the letter must be composed with close regard for the act to which it is designed to persuade.

The Denver Gas and Electric Company is constantly using sales letters as a means of bringing more business. It uses them because actual cost data has proved that it is profitable to do so. Frank Kivel, advertising manager of the company, is the author of a series of three letters which have brought in more than \$2000 in new business during recent months. Nor have the effects of these letters worn off, for cards are still coming into the offices of the company. Three letters on the subject of wiring cost respectively, \$29.84, \$68.49 and \$24.49, or a total of \$122.82. The cost includes compilation of lists, typing, cost of stock and mailing. Accompanying the letters were self-addressed postcards with a blank form on the back of which the housewife was asked to fill out. As proof that the effects of these letters has not worn off, cards are still coming into the offices of the company.

The first letter follows:

Dear Mrs. Stone:

There are three reasons why I wish you would read this letter:

1. Because I don't want you to go another day without electricity; without the benefits of up-to-date lighting and fixtures—without the comfort and convenience of electric time, labor and money-saving appliances.
2. Because the cost of wiring your home for electricity is so low today that you should no longer deny yourself this necessity.
3. Because I feel sure you will let me call at your convenience, let me make an estimate at no expense to you, show you that it won't disturb your household routine to make the change and what a great improvement it will make in your home.

Won't you please fill out the enclosed card and oblige

Yours sincerely,

W. E. McCOURT,

Representative.

The second letter also dealt with wiring but the appeal was highly original. The letter follows:

Dear Mrs. Laws:

All the people who wear glasses don't live in Boston.

Notice how many "Four-eyes" there are right here in Denver. And this can't be blamed on

the glare of the sun—most of it is due to eye strain.

Eye strain from reading and working in poor light.

Why not wire your home for electricity, save your eyes and enjoy the advantages of electrical appliances, thereby saving time, labor and money?

Why not wire your home for electricity when the rates are so low that the most modest home can afford it with six months to pay?

Kindly fill out the enclosed card and let me call on you at any time you suggest, make an estimate of the cost of wiring your home and show you how it can be done cheaply, satisfactorily and without the slightest inconvenience to you.

Sincerely yours,

W. E. McCOURT,

Representative.

The third letter was equally appealing and proved a good business bringer. It follows:

Dear Mrs. Augurman:

To correct a wrong idea some people may have given you, I wish to tell you right away that:

1. Wiring your home for electricity isn't going to disturb your comfort. Your walls and floors won't be torn to pieces. Our skilled workmen do the job quickly and neatly.
2. It isn't going to cost you a lot of money. Electricity is low in price—anybody can afford it. With electricity you enjoy the advantages of good lighting and electrical appliances.

Won't you let me call at any time you suggest and give you an estimate on the cost of electric wiring and fixtures?

Just fill out the enclosed card.

Sincerely,

J. A. MILLER,

Representative.

As electrical sales letters, this trio are models. They are brief and readable, interesting, personal, and each one contains a cleverly constructed appeal. The benefits of electric wiring are convincingly touched on. The present notably thrifty mood of the public is respected in the references to low expense—one letter goes so far as to say, "Six Months to Pay." The idea is combatted that the work of installation will be an excessive annoyance—it is stated, "Our skilled workmen do the job quickly and neatly."

And finally the return postcard accompanies, self-addressed, with convenient blanks helping the prospective customer to indicate first the date, and then the hour she would like the company representative to call.

All of the letters were written on stationery of the Denver Gas and Electric Company and all emphasized the personal note, beginning "Dear Mrs. —" rather than "Dear Madam." The letters do not attempt to completely sell. Rather they attempt to carry the recipient along to the point where she will ask a company representative to call. The company has found that this is a large part of the selling battle. It also aids them in concentrating on prospects who are actually desirous of doing business rather than attempting to uncover good prospects by haphazardly canvassing an entire district.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Port Terminal for S. F. Bay

Bids Called for First Unit of Two Million Dollar Structure

Initial steps toward providing San Francisco with one of the most modern and efficient water front transit sheds in the United States have been taken by the State Harbor Board by advertising for bids for the construction of the substructure, 1000 ft. long, extending along China basin. The work to be done under the first contract consists of the construction of a seawall and wharf.

Bids will be opened January 12 and it is expected that the work will be completed before the end of 1922. It is estimated that the preliminary structure will cost \$800,000. The entire improvement will cost in excess of \$2,000,000.

Filling and dredging for the new wharf will provide 250,000 square feet of land for industrial sites with both rail and water connections. The warehouse which will be erected as soon as the wharf is constructed will provide 190,130 square feet of wharf-shed space and 326,400 square feet of warehouse space. It will be six stories in height. By the use of revolving, semi-portal electric cranes, it will be possible to handle material directly from the ship and the first, second and third floors. Electric whip hoists and conveyors will serve the three upper floors. Three depressed tracks will be placed behind the building.

J. H. McCallum, president of the Harbor Board, declares that the new terminal will establish a port warehousing system on San Francisco Bay which will rival anything in any port in the world.

Portland Ordinance to Regulate Electrical Retail Dealers

Regulation of retail stores selling electrical supplies in order to prevent inferior material being sold is provided for in an ordinance which will come up for passage before the city commissioners of Portland soon. After an investigation made by L. W. Going, chief electrical inspector of the city, it has been conclusively shown that many small retailers are selling electrical supplies of inferior quality. The material does not comply with the specifications of the building code and is considered objectionable because it tends to increase the fire hazard. The terms of the ordinance provide for a license fee from all dealers in electrical supplies. Cancellation of permits granted is the penalty for selling material not coming up to the specifications of the building code.

Oldest Colorado Light Plant Installs New Machinery

The first electric light plant to be built in Colorado, that at Buena Vista, constructed in 1887 at a time when Denver was using gas for lighting, recently changed its system from a 230-volt direct current installation to a 110-volt alternating system, having been the last plant in the state to make the change. It is interesting to note that the first installation comprised a Heislor series direct current unit which was changed to a 500-volt system in 1895, following the construction of a large smelter at Buena Vista. Later the system was changed back to 230 volts.

Washington Crops for 1921 Are Valued at \$157,014,950

According to figures given out by the Federal Bureau of Crop Estimates, and furnished to the Seattle Chamber of Commerce, Washington's 1921 crop production surpassed in value that of 1920 by more than \$9,000,000. The 1921 production reached a total of \$157,014,950. Production for last year was valued at \$147,698,000. Wheat production led the state's products of the year, with 51,000,000 bushels. Next came the apple production with 25,474,000 bushels. Between 4,000,000 and 5,000,000 acres of land in Washington were planted in crops this year, and the outlook for next year is for a much increased acreage, as private and public reclamation and irrigation projects develop.

Pole Line Construction to Be Investigated in California

Standards of construction of overhead electric transmission lines will be investigated by the California Railroad Commission at a hearing to be held in San Francisco on January 16. All electric, telephone, telegraph and railroad utilities and all others including municipalities operating power and signal lines are cited to appear at that time and show cause why the present state law applying to pole lines should not be complied with. This law was passed in 1911 and gave the utilities five years in which to bring the old construction up to the standards established by the law. An amendment in 1915 gave the Railroad Commission discretion as to the time when full compliance must be made. The hearing is to determine whether full compliance should not now be required. The law was designed to effect safety measures for the public and especially for electrical workers. All new construction, since its passage, has complied with the law.

Utah Leads in Electricity

Farmers in Intermountain States Use Most Power Figures Show

Utah farmers enjoy the comforts of electrical conveniences to a greater extent than do farmers of any other state in the Union, according to a report of the United States Department of Agriculture, which was read recently at a meeting of the agricultural committee of the Salt Lake Commercial Club. Utah heads a list showing the percentage of farms in the various states which use gas and electricity.

The table shows that 11,125 Utah farms, or 84.4 per cent, use either gas or electricity. Massachusetts is second on the list with a total of 28.3 per cent. While 30,519 farms in California are benefited, this is only 25.9 per cent of the total number of farms, and the state ranks third. Idaho is twelfth; Nevada fifteenth; Colorado twenty-ninth, and Wyoming thirty-third.

Necessity for developing the agricultural industry in Utah through colonization was discussed at the meeting by D. D. McKay, of Huntsville, president of the Utah State Farm Bureau.

Mr. McKay spoke of the advantage of cooperation of commercial organizations with the farmer, and congratulated the Commercial Club upon the activities of its agricultural committee.

Fire Destroys Lighting Exhibit in Los Angeles Building

Electrical interests of Southern California were heavy losers in a fire in the Los Angeles Chamber of Commerce building which recently destroyed a lighting exhibit which had been installed in the structure after months of accumulative work. The exhibit, which was used for the instruction of high school classes and industrial organizations in effective methods for artificial lighting, was valued at \$3000. It had been collected and installed by the electrical fraternity and the California Electrical Cooperative Campaign.

The flames also destroyed motion picture films valued at \$5000, in addition to damaging the building to the extent of \$20,000. The fire started in the projection room where pictures of the farming section of Kern county were being shown. A spectacular touch was added to the disaster when firemen carried hundreds of people to safety by means of aerial ladders.

Over five miles of transmission lines have been strung from the new Shoshone hydroelectric plant near Powell, Wyo., according to a recent announcement of the U. S. Reclamation Service.

Denver Building Records Reach Record High Mark

Denver is breaking more building records this year. With 5,500 building permits, representing a value of \$9,700,000, issued by the city building department up to December 15th, the prospects of a \$10,000,000 building year are excellent.

The value of permits issued so far in 1921 has been exceeded but five times in the history of the city. The years when other records were established are: 1899, value of building permits, \$10,807,377; in 1890, \$12,835,394; in 1908, \$10,098,020; in 1909, \$11,553,983; and in 1910, \$11,319,955.

The feature of the building this year is the large number of homes constructed. The housing shortage became so serious that a wave of residence building started in the spring and continued throughout the year.

During the first eleven months of 1921 a total of 735 permits for brick residences were issued by the building department. These homes are valued at \$3,496,500. For all of 1920 only 333 brick houses, valued at \$1,917,000, were constructed in Denver.

The number of frame residences for which permits were issued also broke previous records. Up to December 1, permits for 652 frame houses, representing a value of \$937,350, were granted. For all of 1920 but 93 frame residences, valued at \$127,859, were constricted in the city.

Denver stands twentieth in a list of forty-four representative American cities with a population of more than 100,000 for its 1921 building program, according to a comparative statement issued by the civic development department of the Chamber of Commerce of the United States.

Anaconda Copper and American Brass May Consolidate

The American Brass Company will be merged with the Anaconda Copper Company if preliminary steps which were taken at a recent stockholders' meeting of the former concern in New York are consummated. The brass company has until February first in which to decide whether it will turn over 51 per cent of the stock for \$150 per share together with three shares of Anaconda stock. With the Anaconda stock valued at \$50 per share, the deal will involve approximately \$45,000,000.

The American Brass Company is the largest single consumer of copper and zinc in the world and the Anaconda is the largest single producer of these two metals. The American company, during its peak year, produced forty per cent of the country's entire output.

It is rumored in New York that this merger will bring about a consolidation of the Utah copper interests.

Shipyards on San Francisco Bay launched more than 190,000 tons of ships during 1921, according to figures prepared by the Oakland Chamber of Commerce. Twenty-six vessels were constructed during this period against 27 for the preceding year. The 1920 total was 242,500 tons. The list for 1921 includes three of the largest merchant vessels ever constructed on the Pacific Coast, 15,000-ton tankers.

Peak of Public Utility Rates Definitely Passed

California State Railroad Commission Reviews Utility Situation in Letter of Transmittal to Governor

The peak of public utility rates has definitely passed and the decline has set in, according to a letter to Governor W. D. Stephens from the California State Railroad Commission which accompanies the report of the commission for the fiscal year ending June 30, 1921.

The commission declares that the advance in utility rates during the war and the reconstruction period was relatively small as compared with soaring commodity prices, and in this connection says the contrast between regulated and unregulated business is illuminating and "of itself would be sufficient justification, if justification were any longer needed, for the enlightened policy of state regulation." It is shown that if public utility rates had been advanced equally with commodity prices, the people of the state last year alone would have paid in the neighborhood of \$100,000,000 more than they did, to the public utilities. The commission gives detailed figures to support this conclusion, as follows:

Turn Toward Normal

The turn toward normal, the commission states, came near the close of the fiscal year, about last May, and adds:

The Commission was quick to announce that the period when increases were generally justified had definitely passed. In several decisions it was made plain that the peak had passed and the policy was publicly enunciated that the Commission would look with disfavor upon applications for increased rates, save in exceptional cases, where it could be unmistakably shown that unusual conditions warranted special consideration.

Discussing rate reductions and rate investigations under way, the commission informs the Governor that a basis for rate adjustments will soon be established for all the large power companies of the state. This will mark another definite advance in the program of effective regulation, the letter says. Continuing the commission tells of this work, as follows:

In the latter part of the year under review both electric and gas rates were reduced, and there is every reason to hope that the trend toward normal will make further reductions possible. Electric rates, which during the period of shortage and war demand, were held to within 35 per cent of pre-war schedules, are now only 25 per cent in excess of 1913 figures—something that can scarcely be said of anything else that the farmer, the merchant or the householder has had to buy in the past seven years. Specific reductions were made in the rates of the following electric utilities, covering northern, central and southern California: Pacific Gas and Electric Company, 8 per cent; San Joaquin Light and Power Corporation, 5 per cent in its agricultural rate and the Southern California Edison Company 12 per cent. In the case of the Southern California Edison Company, and the Southern Sierras Power Company, definite valuations have been completed and a permanent basis for rate purposes established. The same kind of valuation work, undertaken for the northern companies has been completed and is ready for presentation at hearings now under way. As a result of these hearings, a working rate-base will be determined for the Pacific Gas and Electric Company, the Great Western Power Company of California and the San Joaquin Light and Power Corporation. When this work shall have been completed a comprehensive basis to govern rate adjustments will for the first time be available for all the chief power companies in California. This will mark another definite advance in the effective regulation of public utilities in this state. Rates it should be remembered, for most of the large electric companies were in effect before the Public Utilities Act conferred jurisdiction over them upon the Railroad Commission, and hence the work of the Commission

in this regard, has been confined largely to modifications in specific instances.

The assertion that regulation tends to hamper industry is declared by the commission to be a fallacy, and it points out that the public utilities under regulation are keeping pace with the rapid growth of the state. This is especially true in the development by the power companies of the hydroelectric resources of California's mountain streams. Describing this work, the commission says:

Extensive hydroelectric development work is now under way to meet the needs of the present and immediate future, while nearly all the large power projects make provision for the ultimate development of power far in excess of that provided for in the units under actual construction. This once more illustrates the fallacy of early objections to regulation that it would tend to stifle industry. On the contrary the facts show that regulation fairly applied to rates, service and securities, not only protects the consumer and the investing public, but permits the utilities to develop and to discharge their full duty of meeting the requirements of a rapidly expanding industrial and commercial commonwealth.

During the year the work of harnessing the mountain streams and turning to useful purposes the state's inexhaustible supply of "white coal" has progressed satisfactorily, while still greater projects loom in the not distant future. Hydro plants of a total kilowatt capacity of 145,500 and steam plants of 47,500 kilowatt capacity were completed and the current tied into the existing distributing systems. Not including preliminary work, there is under construction new hydro plants with a capacity of 146,000 kilowatts. This development is being carried on by the Pacific Gas and Electric Company on Pit River and tributaries, to make available 103,500 kilowatts; the San Joaquin Light and Power Corporation, bringing in 10,000 kilowatts at Kern Canyon; Southern California Edison, increasing its Big Creek production by 22,500 kilowatts, and the Southern Sierras Power Company, preparing to produce 10,000 kilowatts at its Leving Creek plant.

Shingle Manufacturers Ask High Protective Tariff

At the fifth annual convention of the Red Cedar Shingle Congress, comprising the shingle branch of the West Coast Lumbermen's Association, held in Seattle December 7-8, resolutions favoring a protective tariff on Canadian shingles sold in the United States in competition with the American made goods were adopted. In adopting the resolutions, the shingle men put their stamp of approval on the shingle clause of the Fordney bill, providing for a tariff of 50 cents a thousand on shingles. Shingles manufactured in Canada, and often by Oriental labor, it was pointed out, are now entering the United States duty free and competing with those made by American labor at a higher cost. The following officers were elected: E. E. Case, Raymond, Wash., president; Col. R. H. Hartley, Everett, vice-president; R. S. Whiting, Seattle, secretary. E. C. Miller of Aberdeen is the retiring president.

The Southern Idaho Land and Power Company is planning the installation of two generating units two miles south of Weiser, on Crane creek, capable of producing 20,000 hp. for irrigation purposes. A reservoir having a capacity of 70,000 acre-ft. will be constructed. W. R. Robison of Portland is the manager of the company.

Hoover is Chairman of Colorado River Commission

First Duty of Body Will Be to Decide Whether Development Will Be Done by Federal Government or Private Interests

Whether the Colorado River will be developed by the Federal government or by private interests will be one of the first questions to be decided by the interstate commission which has been authorized by Congress, according to an announcement from the Department of Commerce, confirming President Harding's appointment of Herbert C. Hoover, Secretary of Commerce, as chairman and federal representative on the commission.

The announcement from Washington covering the appointment of Secretary Hoover follows:

"The creation of the Colorado River commission is the first step in what promises to become one of the greatest of our national improvements, involving a term of years and an expenditure of several hundred millions of either public or private funds. Each of the states of California, Arizona, Nevada, Utah, Colorado, Wyoming and Montana is interested in the irrigation and power to be derived from the river, and considerable conflict has already developed. Unless the river problems are considered as a whole there is likely to be a great waste both in water and power, through private or public grabbing or ill-considered plans, with much conflict both between the states and with private interests.

"The land under irrigation in 1920 from the river and its tributaries amounted to about 2,464,000 acres in the United States, and 190,000 acres in Mexico. If the river were equipped with proper storage dams the amount of irrigated lands could be increased to about 6,123,000 acres in the United States and 800,000 acres in Mexico.

"There is practically no power developed on the river at the present time, but it has possibilities of development of 6,000,000 horsepower as an incident to development of irrigation storage. Some of this horsepower is urgently

needed at the present time in Southern California and Arizona. The progress in long distance transmission will yet bring this entire volume of horsepower into possible national use.

"One of the large problems of the river is the constant threat of the lower river to break through its banks and to flood the Imperial Valley, where something like one hundred million dollars' worth of property is at stake. Such a break occurred a few years ago and it cost several million dollars to restore the river to its normal channel.

"In order to secure a definite control of the flood waters and systematic development of its power possibilities, and give maximum storage for irrigation, the river must be considered as a single problem in the interests of all the states of the nation. If such a coordinated long-view plan is worked out it is anticipated that enough water will be available for all the land available to the river and enough power for all of the community. It is the duty of the commission to determine a plan for such development and to make recommendations to Congress. A number of private concerns are anxious to undertake the development of the power and water. The municipalities of Southern California are also offering to undertake various projects. One of the first questions before the commission will be to determine whether the construction of the dams along the river should be undertaken by the Federal government or whether they should be allotted to these different interests. In any event, whatever program is undertaken, it must be determined from the point of view of the coordinated whole and with view to the greatest national benefit.

"The irrigation service advocates that the first construction should be a dam about 600 feet high at Boulder Canyon, in Arizona, costing about \$40,000,000, which would give an initial amount of upwards of 600,000 primary horsepower. This dam would increase the irrigated acreage in the states of Nevada, Arizona, California and Mexico by 1,300,000 acres, and would give such flood control as would protect the Imperial Valley from destruction by a break in the river banks."

Hetch-Hetchy Dam Is One-Fifth Completed

The Hetch-Hetchy dam, one of the units of the project which will ultimately furnish San Francisco with an abundance of water from the high Sierra, is gradually taking shape. Located on the Tuolumne river, in Tuolumne county, the dam will ultimately rise 312 feet above the stream bed. Present plans call for the construction of a dam 226.5 feet above the stream



View of the Hetch-Hetchy Dam which will furnish water and power to the city of San Francisco. The dam was approximately one-fifth completed when the picture was taken. Seventy thousand cubic yards of concrete had been poured.

Foreign Trade Conference Held in Pacific Northwest

The adoption of a more aggressive foreign trade policy, discussion of various phases of Northwest commerce, passage of resolutions and the election of officers to the permanent trade body, comprised the program placed before the delegates in attendance in attendance at the Pacific Northwest Foreign Trade Conference which was held in Tacoma, Washington, on December 15 and 16.

The sessions were held in the Commercial Club rooms, Tacoma Building. There were 300 delegates in attendance, comprising bankers, steamship owners, operatives, importers, exporters, manufacturers and manufacturers' representatives.

Following the formation of a permanent organization, the following officers were elected to serve during the ensuing year: William Piggott, Seattle, president; C. P. Bishop, Pendleton, Oregon, vice-president; B. F. Stone, Astoria, Oregon, vice-president; J. J. Donovan, Bellingham, Wash., vice-president; E. P. Kemmer, Tacoma, secretary, and E. G. Griggs, Tacoma, treasurer.

The resolutions adopted by the delegates at the conference included the following:

We are emphatically in favor of an American merchant marine and believe that the best interests of foreign trade of the Pacific Coast will be subserved by government aid to the American merchant marine by modifying existing laws and in the equalization of operating costs in such way as will enable successful competition with the vessels of foreign flags operating in

Pacific Ocean trade. The strong reason therefor is that we on this coast are in a formative state of foreign trade relations. Assistance must be given until trade routes and markets are established and the business made profitable.

We urge the United States Shipping Board to give all possible cooperation towards the establishment of regular service of steamships equipped with refrigeration for the transportation of perishable products.

The need of additional and improved facilities for communication between the Pacific Coast and the Orient is imperative. The practice of cable companies in making a charge of three times the normal rate to give normal service imposes an intolerable condition on Pacific commerce. The handling of cable mutilations on some basis similar to the custom before the war is essential to the conduct of trade from this coast.

Southern California Edison Asks For Rate Reductions

The Southern California Edison Company has filed application with the California Railroad Commission for new lighting schedules which will reduce the maximum rate from 9 cents per kilowatt-hour to 8 cents. The schedule, if granted, will take effect January 1 and will apply to 160,000 consumers outside the city limits of Los Angeles. The city council has jurisdiction of rates within the city limits and a separate agreement for charges is in effect there. Vice-President S. M. Kennedy, in announcing the application for new rates, states that increased efficiency of labor has made the reduction possible. He also anticipates that investigations now under way will result in the near future in recommendations for further adjustments in rates, particularly to agricultural and industrial consumers.

bed. The base of the dam is 118 feet below the stream bed, giving the dam, when completed, a total height of 430 feet.

When the accompanying picture was taken 70,000 cubic yards of concrete had been poured and the dam had reached a point equal to the height of the stream. When completed the dam will contain 370,000 cubic yards of concrete.

Salt Lake City Seeks Sites For Reservoirs

Filings have been made with Dana Parkinson, supervisor of the Wasatch National Forest, by Salt Lake City for two reservoir sites in Big Cottonwood canyon. One site takes in the Reynolds flat and the other is in the vicinity of the Argenta mining property. These filings are for the purpose of materially increasing the city's water supply.

It is estimated by the United States Geological Survey that the annual runoff of Big Cottonwood creek is approximately 60,000 acre-feet, largely in the spring. Specifications for the conserving of this water in the two sites filed on have been prepared by Ralf R. Wooley, hydraulic engineer of the survey, and call for the construction of a dam at the Argenta site 250 feet high, between 1100 and 1200 feet long at the top. This, it is estimated, would store in the neighborhood of 16,000 acre-feet of water, which is more than four times the amount now used by the city. The other dam would be approximately 200 feet high and would store about 12,000 acre-feet.

\$12,000,000 Merced Bond Issue For Irrigation Carries

Twelve million dollars in bonds has been voted by Merced, California, for financing an irrigation project which will furnish water to 180,000 acres of semi-arid land and add a 40,000-horsepower hydroelectric plant to the San Joaquin valley district. The power will be sold to the San Joaquin Light and Power Corporation. The project includes the construction of a dam 300 ft. high on the Merced River near Exchequer which will impound 250,000 acre-feet of water.

Work on the project will begin shortly after the first of the year as all legal steps necessary were taken before the bond election. It is planned to complete the dam and power house within two years. The detailed estimates covered by the \$12,000,000 issue follow:

- Construction of dam, \$3,763,000.
- Relocating and rebuilding 20 miles of Yosemite Valley Railroad, \$2,043,000.
- Construction of distribution system, \$1,688,000.
- Purchase of Crocker-Huffman irrigation system, \$2,250,000.
- Power plant, \$2,000,000.
- Purchase and installation of 100 drainage pumps, \$200,000.

Portland Electrical Interests Stage Range Campaign

The electrical contractors and dealers of Portland in cooperation with the local power companies, feeling that the price of electric ranges had reached a sufficiently low level to encourage the public to buy, put on an active range campaign early in November. A price slightly above cost was agreed upon on all types of ranges and a flat price to cover the inside wiring was made and prices quoted on ranges installed either with or without inside wiring. A feature of the campaign is the sale of the ranges installed complete including inside wiring on a deferred payment plan. An initial payment of \$35.00 down is required and the balance is payable in monthly installments, in many cases as low as \$10.00 a month.

The underlying scheme of the campaign is that the power companies buy the ranges in large quantities and the dealers receive them on consignment and are paid a stipulated commission on each sale. Wiring for ranges sold by the power companies is equally distributed among the dealers participating in the campaign. Cooperative advertising by the dealers and the power companies is carried on in the local newspapers.

The Pacific Gas and Electric Company has commenced work on improving the water supply of the city of Redding, Cal. The work, which will cost between \$40,000 and \$60,000, calls for the re-routing of the mains, the improvement of the reservoir and the installation of a filtration plant.

Bureau of Mines engineers are examining the development work on a deposit of lignite near Reno, Nev., with a possibility of determining whether the deposit is available, after briquetting, as a domestic fuel. It is also hoped that it may be used as a power fuel in plants in the vicinity of Reno.

Utah Supreme Court Upholds Utilities Commission Decision in Rate Case Contested by Utah Copper Company Gives Utility Body Right to Increase Rates

The Supreme Court of Utah has just handed down a decision sustaining the order of the public utilities commission of Utah involving increased rates for power supplied by the Utah Power and Light Company to its power customers in that state. The decision of the Supreme Court is on the appeal of the Utah Copper Company from the commission's award, by review proceedings in the Supreme Court.

It was the contention of the copper company that the new rates were confiscatory, and it also questioned the jurisdiction of the commission and legality of its proceedings in general, both in the "special contract case" and in the granting of the rate increase.

In September, 1919, the commission ordered the holders of special contracts with the Utah Power and Light Company to show why these contracts should not be considered as preferential and discriminatory as against other power users. About three months later the power company applied for a general increase in its power schedules in the state of Utah.

The two cases were heard together, and the first decided in October, 1920, by which decision the commission ordered the holders of special contracts to be placed on standard schedules, on the same basis as other power customers.

This decision was appealed to the Supreme Court, and last February was affirmed, the Supreme Court upholding

the right of the commission to alter the contracts in question, as to rates. The State Supreme Court's findings in this case are now pending before the United States Supreme Court.

In March, 1921, the commission decided the application of the power company for a general increase of its power rates, by allowing an increase, which increase, however, was not as great as that requested by the power company.

This latter decision was also brought into the Supreme Court by the Utah Copper Company, and has likewise been upheld, as above stated.

In his opinion, Chief Justice Corfman, of the Supreme Court, stated:

"It appears that not only is there substantial evidence in this record to support the findings of the commission as made, but the great weight of the evidence is to the effect that if the power company was to be permitted to exist as a public utility and render efficient service to the consuming public, then, temporarily, at least, it was necessary that the rates established by the commission be practically maintained. * * *"

"Under the circumstances, we find that the commission acted regularly and within the powers conferred upon it by the legislature in ordering the contract rates superseded by the regular schedule rates. Further, we are of the opinion that the contention made by the copper company that the schedule rates are unjust and confiscatory as applied to its service, has not been sustained. Aside from that, and especially as to whether the schedule rates are too high or too low, we express no opinion. In either event that is a matter to be determined by the commission alone. Until the commission has acted outside its powers, or until it clearly appears that the rates fixed by it are unreasonable or confiscatory in their effect we have no right to interfere."

Westinghouse Announces Big Order From Japan

Creation of a super-power system in Japan similar to that proposed for the area between Boston and Washington, is heralded in an announcement that the Westinghouse Electric International Company has received an order from Takata and Company, Japanese agents, for \$2,000,000 worth of hydroelectric equipment to be installed by the Daido Electric Power Company of Japan, in two plants near Tokio. The current will be transmitted at 154,000 volts.

This is the second large order that the Westinghouse Electric International Company has received from Japan during the past few weeks. The first order was for switching equipment for the Tokio Electric Company and amounted to approximately \$1,000,000.

Of particular importance to American manufacturers of electric railway equipment is the announcement that a fundamental policy for the electrification of Japanese railways has been announced by the official commission charged with this work. The U. S. Department of Commerce has received a copy of the report which recommends the immediate electrification of approximately 2000 miles of steam railway lines. Portions of the report follow:

(1) All sections in the suburbs of cities where there is a heavy railway traffic, such as Kyoto-Kobe, 47 miles; Kobe-Himeji, 34; Minatomachi (via Kitsu) Kyoto, 51; Moji-Hakata, 48; and Osaka-Tennoji, 6 miles.

(2) Sections of high gradient where there are many tunnels and also those where abundant water power can be utilized, such as

Odawara-Numazu, 26 miles; Maibara-Imasho, 47; Hachioji-Shioiri, 116; Nagoya-Shinoo, 151; Fukushima-Yonezawa, 26; Yashiro-Kashima, 94; Kameyama-Nara, 46; Utsunomiya-Nikko, 25; Koriyama-Niigata, 172; Oguda-Shinjo, 58; Takasaki-Yokokawa, 18; and Karuisawa-Naoetsu, 92 miles.

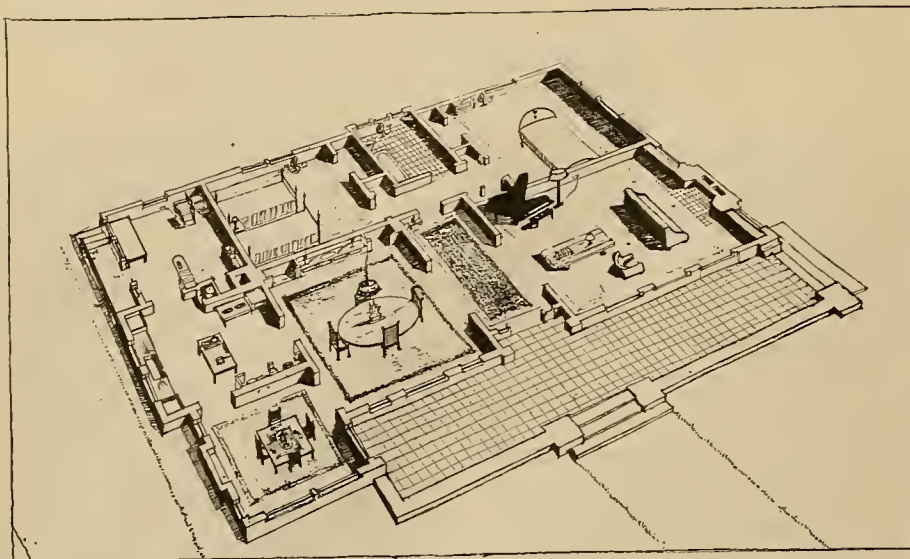
Idaho Power Companies Give Rebates to Farmers

Rebates totaling \$37,467 are to be allowed farmers in Idaho using electrical energy for pumping purposes. The 1921 session of the Idaho legislature passed a law granting power companies operating in the state a rebate on taxes, and provided that the amount of the rebate be apportioned among the various irrigation power users.

In compliance with the provisions of this statute the Idaho Power Company has filed with the public utilities commission a report which shows that 18,326 horsepower is used in the state annually for pumping water electrically.

Sections of the law provide that the public utilities commission shall calculate the amount of the total rebate to be placed to the credit of each consumer. After this is done an order will be issued by the commission authorizing the power company to credit the various power users of the state with their proportion of this rebate.

The Chamber of Commerce of Manila, P. I., has sent out invitations to manufacturers, exporters and importers to take part in a carnival and commercial and industrial fair which is to be held in the Islands February 4-12.



A new four-page booklet issued by the California Electrical Cooperative Campaign contains a cut-in section of an electrical home showing the furnishings, in addition to the conventional floor plan showing the wiring details.

California Campaign Issues New Wiring Booklet

The California Electrical Cooperative Campaign has revised the original single sheet wiring diagram of an electrical home and is preparing to issue a four-page booklet designed as a practical aid to the home builder in properly equipping the home so as to be best able to use the many electrical appliances which have been designed to lighten the work of the housewife.

At a recent meeting of the advisory committee it was felt that the original plan was slightly overdone. The revised plan has been worked out with an idea of showing the minimum number of switches and convenience outlets which should be installed in a modern home.

The cover of the new booklet shows an elevation drawing of the home. The two inside pages reproduce the floor

plan, one a conventional architect's drawing, the other a cut-in section, showing the furnishings and arrangement of appliances. The last page contains drawings and descriptions of the convenience outlet.

These plans will be distributed by the field men to architects, builders and realtors. Quarter cards have been issued which bear the announcement, "This House is Equipped with Convenience Outlets." These cards are placed on the front of every home under construction which has at least one outlet in each room.

The advisory committee has also started a survey of the actual cost of operating the various classes of appliances so that charts may be placed in the hands of the various sales organizations and contractor-dealers, which will show the cost in terms of money rather than kilowatt-hours.

Books and Bulletins

The M. W. Kellogg Company, New York, manufacturers of high pressure piping, hydroelectric lines, and welded containers of all kinds, has issued a complete and exhaustive catalog of its lines, which should prove of especial value to the consulting hydroelectrical engineer as well as to many other men in the industry. The book places at the hand of the engineer special information and data gathered by its engineers during the past years. It is divided into four sections, one dealing with high pressure hydroelectric pipe lines, another with power plant piping, a third with oil stills and the last with hammer welding. The arguments in each section are enforced with many illustrations, a large number of which are installations of the company's products.

The General Electric Company has prepared a new booklet on highway lighting units, a new field for illumination owing to the increasing amount of night travel on the concrete highways in many of the western states. Fully illustrated and covering all of the latest developments in this new field, the booklet is a valuable piece of descriptive literature for those responsible for the highways which have made the western states famous.

The Ideal Electric Manufacturing Company, Mansfield, Ohio, has issued bulletins No. 106 and No. 107, the first dealing with motor generator sets and the second with electro-plating apparatus.

McGraw-Hill Company Purchases Electrical Review

The McGraw-Hill Company, Inc., has purchased the Electrical Review, and will continue to publish it in Chicago under the name of Electrical Review and Industrial Engineer. Under the present plans, as announced by James H. McGraw, president of the company, the publication will be a practical monthly magazine devoted to the operation and maintenance of electrical and mechanical systems in mills and factories. Present subscribers to Electrical Review will be allowed to choose the publication which best suits their needs. They can continue their subscription to the new practical monthly or change to the Journal of Electricity and Western Industry, Electrical World, Electrical Merchandising, or Power.

The extra zone postage on McGraw-Hill publications to points west of the Mississippi and in Canada has been cancelled. The ruling regarding Canadian postage applies especially to the Journal of Electricity and Western Industry, Canadian subscribers now being able to purchase the magazine at the same rates as those in the United States.

Butte, Montana, through the agency of its Rotary Club and Chamber of Commerce, will hold an international copper exposition early in the year, for the purpose of demonstrating the many uses which the red metal has.

San Francisco Firm Offers to Buy Muscle Shoals Project

The Construction Company of North America, a San Francisco firm engaged in driving the tunnel for the Hetch-Hetchy project, has made an offer to the U. S. Government for the Muscle Shoals power and nitrate project which is contended to be over one and a half billion dollars in excess of the offer made recently by Henry Ford.

The San Francisco firm, according to reports from Washington, D. C., will build its own plant, operate the properties for fifty years and pay the government one-half of the net profits. The project will be financed by bonds redeemable in twenty-five years. The Ford offer asks Congress to appropriate \$30,000,000 for the completion of the project with a like sum at the end of ten years for additional developments. In return the government will receive a set sum of \$2 per horsepower-year over a term of 100 years. The plant would ultimately develop 600,000 horsepower.

The government has spent \$17,000,000 on the construction of the project, which was stopped at the end of the war. It is estimated that \$23,000,000

must be expended before the plant can be placed in operation.

Those concerned in the Muscle Shoals venture are: C. C. Tinkler, president of the Construction Company of America; Fred C. Hitchcock, vice-president; George Perry, secretary; William F. Humphrey, attorney; J. A. McCarthy, treasurer; Alfred J. Cleary, consulting engineer, and Professor Charles Derleth of the University of California, special consulting engineer.

Journal Radio Message Heard in Washington, D. C.

The Los Altos radio station of the Colin B. Kennedy company, known as 6XAC, from which the radio telephone news and business reports prepared by the Journal of Electricity and Western Industry is sent out every Monday night, has been heard in Washington, D. C. Arthur L. Budlong intercepted both the voice and telegraph message and the report was checked by Herbert A. Wadsworth who also operates a station in the national capital. Only one tube was used and no amplifiers were used on the receiving end. The same message was also intercepted in Omaha, Neb., and Minneapolis, Minn.

Meetings of Interest to Western Men

S. F. Electrical League Plays Host at Christmas Party

Eighty-three small boys and girls from the San Francisco Nursery for Homeless Children were given a taste of real Christmas cheer when they were

Claus was made to appear, being impersonated by J. S. Thompson of the Pacific Electric Manufacturing Company, and gifts were distributed to each child.

In addition to the Christmas tree and the distribution of gifts there was a



Eighty-three orphan children were made happy at the Christmas party given by the San Francisco Electrical Development League in the ball room of the Palace Hotel on December 19.

guests of the San Francisco Electrical Development League at a luncheon and kiddies' party on December 19. The luncheon, with the homeless tots as guests, has become an annual affair with the San Francisco men of the electrical industry, and this season's party was voted the most successful one in the annals of the organization. Santa

musical program in which outside talent, as well as the children themselves took part.

The committee which planned and executed the party consisted of Arthur Rowe, chairman, C. B. Kenny, Grover Anderson, R. W. Du Val, Robert McDonald, E. E. Browne, W. B. Francis and H. L. Garbutt.

Utah Contractor-Dealers Elect Officers for New Year

At a meeting of the Contractor-Dealers' Association of Salt Lake City, November 16th, the annual election of officers took place, and the following were elected for the ensuing year:

E. H. Eardley, manager Eardley Electric Co., president, succeeding James Walker; Fred C. Wolters, manager Modern Electric Co., vice-president, succeeding Geo. R. Randall; G. W. Forsberg, manager Wasatch Electric Co., secretary, succeeding E. H. Eardley; L. G. Robbins, electrical contractor, treasurer.

New members of the Advisory Committee of the Rocky Mountain Electrical Cooperative League to represent the Contractor-Dealers, were chosen as follows: F. C. Wolters, L. G. Robbins, Claude R. Dodge, manager Dodge Bros. Electric Co., and G. W. Forsberg. The above new members of the Advisory Committee succeed the following mem-

bers: E. H. Eardley, Geo. R. Randall and James Walker.

Thirty students of the Agricultural College at Logan have made application to the Ogden Chapter of the American Association of Engineers for a charter under which they may operate as a student club under the jurisdiction of the local chapter. The students are studying engineering. The college members will be allowed to participate in all functions of the local club and the local chapter will in return assist the collegians in all of their engineering endeavors. Several members of the faculty of the school will be included in the college chapter.

At a recent meeting of the Seattle Engineers' Club, J. W. Miller of the J. W. Miller Aircraft Company, addressed the meeting on the subject of "Aircraft from an Engineering Standpoint."

A. A. E. Annual Convention in Salt Lake Next June

The eighth annual convention of the American Association of Engineers will be held at Salt Lake City June 4, 5 and 6, and active work toward making the convention a success has already been started by the local officers. C. J. Ullrich is chairman of the convention committee of the Salt Lake chapter, with H. G. Harmon and C. E. Painter as his committeemen. M. D. Williams, E. E. Kidder and C. W. Cross, representatives of the Ogden chapter, have pledged the assistance of that body in making the convention a success.

It is expected that there will be at least 300 delegates present, and that most of them will bring their wives.

It is planned to make this the vacation trip of the delegates, with trips to Yellowstone National Park, southern Utah and other points.

The support of the Commercial Club and other organizations has been promised in making the convention a success. Sub-committees for the work of preparation are now being appointed.

Utah Engineers Ask Licensing of Members of Profession

The licensing and registration of all engineers in the state of Utah is recommended in the report of the legislative committee of the Ogden chapter of the American Association of Engineers. According to E. E. Kidder, chairman of the committee which made the report, the matter will be brought before the state legislature in the near future by the chapters of the A. A. E. in conjunction with the Utah Engineering Council. The report, which is a most extensive one, states:

"If people trust their affairs and property with the licensed legal man, their health to licensed doctors, their children with licensed teachers, why should there be any hesitation about placing the construction and operation of great public works and utilities with the licensed engineer? That this will appeal to the ordinary fair-minded citizen is not doubted. No practicing engineer will be injuriously affected. The full benefit of such a law will not be apparent at once, but will gradually make itself felt until the engineer and the public interest is as well protected in his case as in that of other professions."

The Synchronous Club of Los Angeles numbering among its members nearly a hundred of the electrical engineers of the city, held its December meeting at the Edison Building, Tuesday the 13th. Under the direction of R. H. Manahan of the department of electricity, the first of a series of lectures on Wiring Methods and the Inspection Service was presented to the members and the invited public.

The December meeting of the American Institute of Electrical Engineers, Seattle section, held on Dec. 10, was in the form of a trip of inspection of the U. S. S. Tennessee at the Puget Sound Navy Yard, Bremerton. Immediately following the inspection, dinner was served and the following program presented: "Main Drive," by Lieut. Commander A. M. Charlton, engineer officer; "Ship Service, Power Plant," by Lieut. Commander Hugh L. White, electrical officer; "Battery of the Tennessee," by Commander Russell S. Crenshaw, gunnery officer.

COMING EVENTS

WESTERN ASSOCIATION OF ELECTRICAL INSPECTORS

Annual Meeting—Chicago—January 17, 18, 19, 1922

PACIFIC COAST DIVISION, ELECTRICAL SUPPLY JOBBERS ASS'N

Quarterly Meeting—Del Monte, Cal.—January 25-28, 1922

LIGHTING FIXTURE DEALERS' SOCIETY OF AMERICA

Annual Meeting—Milwaukee—January 30-February 2, 1922

SAN FRANCISCO SECTION, AMERICAN WELDING SOCIETY

Organization Meeting—January 13, 1922

O. C. Merrill, executive secretary of the Federal Power Commission, was one of the principal speakers before the League of the Southwest at Riverside recently and later discussed the Colorado River problem before the San Francisco Engineers' Club. Mr. Merrill believes that the two fundamental premises behind such a development as



O. C. MERRILL

is contemplated on the Colorado are the flood menace in California and the creation of a super-power system, which would be the largest in the world. Mr. Merrill is thoroughly familiar with the problems which are peculiarly western for he practiced as a civil engineer in the Pacific Coast states for many years. Later he was in charge of all water powers which came under the jurisdiction of the U. S. Forest Service and in 1914 was called to Washington to become chief engineer for that department of the government. His statements regarding the Colorado development, coming as they do from one attached to that agency of the government at Washington with the full power to act on such development as that proposed for the Colorado River, must necessarily carry the force of conviction as a result of engineering experience and at the same time indicate that the government will look first to the developing agency which can combine speed, experience, and a comprehensive plan as the most desirable agency to which the first development projects will be granted.

C. E. Ingalls has resigned as San Francisco district manager for the Crocker-Wheeler Company and will shortly enter the field as a manufacturer's representative with offices in the Rialto Building. Arthur Purdon has been appointed to the district managership to fill the vacancy caused by Mr. Ingalls' resignation.

Otto E. Ostoff, vice-president of H. M. Byllesby and Company of Chicago, commented upon the prosperity of California following a four weeks' tour of inspection of the Byllesby gas and electric properties in this state.

J. Vipond Davies, internationally famed engineer, known to the West for his recommendation regarding the bridging of San Francisco Bay, presided at the meeting in New York when Marshal Ferdinand Foch was conferred an honorary membership in the four national engineering societies.

Personals

K. R. Kingsbury, president of the Standard Oil Company of California, who has recently returned to San Francisco following an extended eastern business trip, states that the general impression in the East is to the effect that business is definitely on the upward trend.

Theodore E. Burger, former Los Angeles district manager for the Western Electric Company, has been appointed secretary of the Society for Electrical Development, Inc., with offices in New York City. For two years Mr. Burger was chairman of the Los Angeles Electric Club and was one of the chief proponents of the cooperative movement among the branches of the industry on the Pacific Coast.

George L. Hoadley, former instructor in electrical engineering at Washington State College, Pullman, Wash., is now head of the department of electrical engineering in the Milwaukee School of Engineering.

Robert H. Hull, former electrical engineer for the Great Western Sugar Company of Denver, has become instructor of electrical engineering in the University of Colorado, Boulder.

Perry L. Harris, electrical engineer with the Federal Shipbuilding Company of Kearney, N. J., has resigned to become associated with the Newbery Electric Corporation of Los Angeles.

William Neiman, formerly with the Universal Gas and Electric Company of San Francisco, has taken the position of assistant superintendent of the new business department of the Pacific Gas and Electric Company.

John H. Ebaugh has left the Los Angeles branch of the Allis-Chalmers Manufacturing Company to take the position of instructor in the electrical department of the Fresno Technical High School, Fresno, Cal.

Frank Venable, assistant manager of the Montana Electric Company, Butte, has been appointed to a special committee of the Associated Industries of Montana, which has been charged with the work of extending the scope of the association until it fulfills the duties of a state-wide chamber of commerce.

G. I. Kinney, San Francisco manager for the International General Electric Company, has been elected to the directorship of the Foreign Trade Club of San Francisco, as the result of his activities in the promulgation of foreign trade out of San Francisco.

R. I. Bentley, president of the California Packing Corporation, has been elected vice-president representing California of the Association of Pacific Fisheries and the National Cannery Association.

A. M. Poindexter of the Denver jobbing house bearing his name, was a member of the Denver revolver team which made the highest score in the national contests held recently. The result of the match gives the Denver team the Winan's bronze trophy and the championship title of the United States.

Herbert C. Hoover, Secretary of Commerce and well known westerner, has been appointed chairman of the Colorado River Commission by President Harding. Secretary Hoover will be the federal government representative on the commission, which will be comprised of delegates from the seven states through which the river flows and which will be charged with the equitable distribution of the waters of the river among the states for irrigation and power purposes.

W. S. Rathbun of the electrical department of the Rocky Mountain Fire Underwriters is chairman of a committee appointed to reorganize the American Legion Posts in Denver.

Ernest R. Fellows has been appointed superintendent of construction for the Associated Telephone Company, Long Beach, Cal. Mr. Fellows was formerly with the General Electric Company as inspector of hull material for the U. S. Navy.

T. O. Kennedy, general superintendent of the Denver Gas and Electric Light Company, attended the executive committee meeting of the N. E. L. A. in New York recently.

A. E. Wishon, general manager of the San Joaquin Light and Power Corporation, has been appointed by President A. B. West as chairman of the Committee on Amendments to the Constitution of the Pacific Coast Electrical Association. The committee will have the important work of revising the constitution to meet the recent change in name of the organization, and will consider as well the various other suggestions toward broadening its field which have been brought up within recent months. Mr. Wishon's active work in the association, of which he was president during the past year, places him closely in touch with its needs and opportunities. Other members of the committee are: D. E. Harris, vice-president and manager of the Pacific States Electric Company, A. W. Childs, superin-



A. E. WISHON

tendent of sales of the Southern California Edison Company, K. E. Van Kuran, manager of the Los Angeles branch of the Westinghouse Electric and Manufacturing Company, L. H. Newbert, in charge of the Alameda division of the Pacific Gas and Electric Company, and Clyde L. Chamblin, of the California Electrical Construction Company.

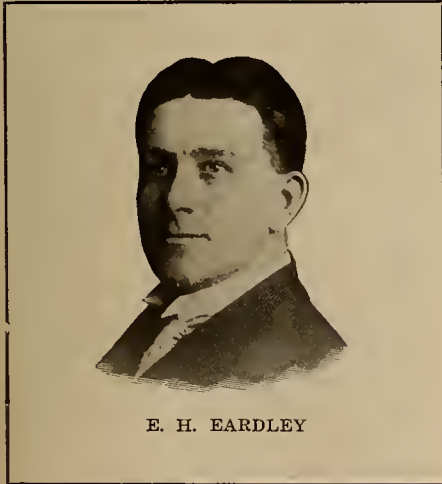
C. A. Semrad of the Western Light and Power Company, with headquarters in Boulder, Colo., is an active member of the Rocky Mountain division of the N. E. L. A. committee on public utility information and a regular attendant at the weekly meetings in Denver.

W. J. Barker, general manager of the Denver Gas and Electric Light Company, and L. M. Cargo, intermountain manager of the Westinghouse Company, took an active part in the Denver Motor Club's Christmas party for the poor children of that city.

Franklin T. Griffith, president of the Portland Railway, Light and Power Company, and Guy W. Talbot, president of the Pacific Power and Light Company, both of Portland, recently returned from Washington, D. C., where they were in conference with the Federal Power Commission together with members of the Water Power Development Committee of the National Electric Light Association, on matters in connection with the administration of the Water Power act.

H. F. Jefferson, chief engineer of the Kilbourne-Clark Manufacturing Company, Seattle, is receiving congratulations for the interesting and novel description and demonstration of the scope of wireless telephony which he gave before a recent meeting of the Seattle Engineers' Club.

Edward H. Eardley, who was recently elected president of the Contractor-Dealers' Association of Salt Lake City, is one of the pioneers in the electrical industry in that city, having grown up with it from the time he accepted the position of office boy with the Holding Electric Company. In 1906 he left that company and established a contractor-dealer business of his own, which has grown until at the present time the Eardley Electric Company is one of the most active and progressive firms of its kind in the city. Mr. Eardley has been actively connected with the Contractor-Dealer Association for the past twelve years and has served



E. H. EARDLEY

as secretary of that organization for five years. He has been an enthusiastic advocate of the cooperative idea and was one of the instigators of the movement which resulted in the formation of the Rocky Mountain Electrical Cooperative League. He has also been recently elected to the executive committee of the National Association of Contractor-Dealers.

J. A. Kahn, Robert Miller, A. J. Calloway and B. E. Rowley were the electrical men who took an active part in the wholesale trade trip which the Salt Lake Chamber of Commerce took to Price, Utah.

L. T. Merwin, general superintendent of the Northwestern Electric Company of Portland, is a recent San Francisco visitor, having been in that city for the purpose of conferring with officials of California power companies.

A. R. Woolley of the Salt Lake office of the Edison Electric Appliance Company, assisted J. F. Senior, the Denver representative of that company, in serving the Denver dealers during the holiday trade.

W. W. Hanscom, former chairman of the San Francisco section of the American Society of Mechanical Engineers, has returned from New York City where he represented the San Francisco section at the recent convention of the Society. While East Mr. Hanscom made a visit to the Bureau of Standards at Washington, the Westinghouse Company at East Pittsburgh, the General Electric Company at Schenectady and the Waltham Watch Company at Waltham, Mass. He returns enthused and greatly impressed with the splendid work that is being accomplished by the American Society of Mechanical Engineers.

R. G. Gentry, assistant commercial manager of the Denver Gas and Electric Light Company, was elected treasurer of the Colorado branch of the Gideons at the state convention recently held in Denver.

J. W. Hancock, a prominent Denver electragist, was recently elected a director of the Kiwanis Club in that city, while Harry H. Argabrite of the Western Electric Company was chosen district trustee.

A. J. Calloway, Salt Lake manager of the Western Electric Company, was a speaker at the Denver Electrical Cooperative League meeting of December 6th.

Carl O. Martin, district representative for the Benjamin Electric Manufacturing Company with head quarters in Seattle, spent some time investigating conditions around Salt Lake City during a recent tour of the Intermountain district.

Burton Y. Gibson, specialist on ranges and heavy duty electric cooking equipment, has been appointed Pacific Coast representative for the Walker and Pratt Manufacturing Company of Boston, makers of the Crawford Electric Range, who recently advertised that "3,000,000 breakfasts are daily cooked on Crawford ranges." Mr. Gibson represented the Hughes electric range on the coast before the Hughes interests were consolidated with the Edison Electric Appliance Company. Mr. Gibson will establish offices in San Francisco.

Harold W. Burchard has been named manager of the shipping department of Frank Waterhouse and Company, Seattle, succeeding Percy S. Laing, who resigned recently to engage in business on his own account. Mr. Burchard is said to be the youngest shipping man on the Pacific Coast to hold a place of such importance. He is a World War veteran, having served as a lieutenant of infantry in the famous Ninety-first Division.

George F. Nicholson, chief engineer for the Port of Seattle, has been called to Cork, Ireland, where he has been commissioned to make a comprehensive plan for the development of the harbor of that city. Mr. Nicholson has secured a six months' leave of absence from his present post, and upon the completion of his work in Ireland, will visit all of



G. F. NICHOLSON

the principal port cities of Europe with a view of gathering information which might be valuable in the development of the port facilities of Seattle. Mr. Nicholson is a native of Indiana and a graduate of Rose Polytechnic Institute in civil and mechanical engineering. During the four years following his graduation he was engaged in railroad construction work in Mexico. In 1908 he was appointed resident engineer for the Chicago, Milwaukee and St. Paul Railroad, after which he was associated with Virgil Bogue, New York consulting engineer, in planning a comprehensive development for practically every harbor in the Northwest. He joined the Seattle Port Commission nine years ago and for the past five years has been chief engineer for that body. He is a recognized authority on harbor development. He is a member of the American Society of Civil Engineers and the American Association of Engineers.

J. C. Davidson, manager of the electrical department of Hendrie and Bolt-hoff, one of Denver's largest jobbing houses, after attending the jobbers' convention in Cleveland, called upon a number of the eastern manufacturers which his firm represents and did not return to Denver until Christmas.

George Hemmen of the B. K. Sweeney Company, Denver, and Carl M. Heintz, western sales supervisor of the Westinghouse Electric and Manufacturing Company, were guests of the advisory committee of the Rocky Mountain Electrical Cooperative League at a recent meeting in Salt Lake City.

Obituary

Chester C. Doud, president of the Doud-McFarlane Machinery Company of Tacoma, a prominent figure in Washington lumber and machinery business for the past thirty years, died at his home in Tacoma recently.

The Mine and Smelter Supply Company of Denver, Westinghouse distributors, arranged a special waffle iron demonstration in the windows of The Denver Gas and Electric Light Company, which included a daily waffle-eating contest during Electric Week, Dec. 5-10.

The Apex Electrical Appliance Company, as the first stop on a western demonstration tour, had its representative, Miss Marie Carlson, conduct a window exhibition of the ironer put out by that company at the store of J. Van Dyk in Denver.

"Columbalite" is the name of a new enclosed semi-direct lighting fixture being made by J. W. Hancock, a prominent Denver electragist.

Nollenberger and Dornier, Denver wiring contractors, have taken over the Colorado Electric Machine Company, which is specializing in motor repair and installation work.

The B. K. Sweeney Electrical Company of Denver has proposed five and ten per cent wage reductions, effective January first, according to a notice recently filed with the Colorado State Industrial Commission. It is proposed to make a five per cent reduction on salaries ranging from \$75 to \$100 a month and a ten per cent reduction on all salaries over \$100 per month.

The Northwestern Supply Co., 104 Prefontaine Place, Seattle, on December first changed its name to the Tri-State Electric Company. This firm deals in wholesale electrical supplies in Washington, Oregon and Idaho. The company is capitalized for \$50,000 and the stock owned by A. W. Woodville, president, and F. J. Jackson, secretary.

The Apex Electric Company of Seattle recently opened a retail store at 902 Fourth Avenue under the ownership of Secord and Stusser, Inc.

Rankin and Cherrill, contractor-dealers of Vancouver, B. C., have recently opened a new store at 528 Hastings Street West. This is the second store to be opened by this company, the first being located at 55 Hastings Street West.

Manufacturer, Dealer, and Jobber Activities

M. Sweyd, western representative for Lionel toys and electric trains with offices in San Francisco, has moved from 718 Mission Street to the Furniture Exchange.

The Salt Lake City branch of the Edison Electric Appliance Company had one of the most effective holiday window displays of any in the Intermountain district. John Montgomery, the local manager, is receiving congratulations for the display, which cost approximately \$400.

The Muir Electric Company has recently opened a new store at 978 Granville Street, Vancouver, B. C.

The Electric Specialty Shop, 1320 Granville Street, Vancouver, B. C., has just started a combined contractor-dealer establishment and battery service station.

The Perry Electric Company, 1150 Granville Street, Vancouver, B. C., has expanded to such an extent that a second establishment has been opened at 985 Robson Street.

Theo F. Dredge has been appointed western representative for the Coffin Valve Company, Boston, who have recently placed on the market the Coffin balanced needle valve. The western offices will be in the Monadnock Building, San Francisco.

The Beaver Machine and Tool Company, Newark, N. J., manufacturers of Beaver electrical specialties, have just brought out a combination switch and heater plug designed for use with all types of appliances. The device is the same size as an ordinary plug yet contains a switch movement. This newest accessory promises to fulfil a long-felt need. It is described in catalog No. G-1.

The Shipowners Radio Service, Inc., formerly located in the Kilbourne-Clark Building, Spokane Street and

Marginal Way, Seattle, opened a retail store at 215 James Street, in charge of G. V. Wiltse. The firm has a large number of stores throughout the West.

The Lakewood Engineering Company, Cleveland, has announced the consolidation of its offices with those of the Smith-Booth-Usher Company, who will act as its exclusive representatives at 50 Fremont Street, San Francisco, and at 228 Central Avenue, Los Angeles.

Harold W. White has purchased the interest of Mr. Castello in the firm of White-Castello Electric Company of Eugene, Ore., and the firm will hereafter be known as the H. W. White Electric Company.

The Stevens Sales Company, Salt Lake City, distributors of motors, pumps, lamps, and handling a general line of such electrical apparatus and equipment of standard type, has moved to its new home at No. 134 West Second South Street, where it has more commodious quarters, including a well-equipped office and warehouse.

The Buckeye-Prima Company, Sidney, Ohio, manufacturers of electric washers, has placed on the market a new wringer which is equipped with a large soft roll claimed to do away with the necessity of tension screws, and guard roll. It is also claimed that the wringer will not injure fingers nor break buttons on the clothes. The wringer was invented by R. J. Anderson.

The Benjamin Electric Manufacturing Company, Chicago, is undertaking a direct mail advertising campaign on behalf of the dealers to aid in popularizing electric appliances. The company is also sending out to the trade an effective counter stand and window poster with interesting and valuable suggestions to customers.

The Cutler-Hammer Manufacturing Company, Milwaukee, through its switch and specialty department, announces that there has been placed on the market a new attaching device for portable electric appliances. The device provides a flush mounting and a neater looking installation than is usually possible with an ordinary surface receptacle.

The Pittsburgh Gage and Supply Company, manufacturers of Gainaday Household Appliances, by the appointment of Albert A. Erdman as western sales manager, is definitely preparing to enter the appliance field on the Pacific Coast in an aggressive manner. Gainaday products have not been represented for some time. Mr. Erdman will begin his work shortly after January 1st and will be located at Clark Hotel, Los Angeles, until warehouse facilities have been established. He will begin immediately to develop present dealer connections and establish new ones.

The Century Electric Company, through R. J. Davis, district sales representative, announces a reduction of ten per cent on type "SC" squirrel cage induction 50 and 60-cycle motors. The prices were effective December first.

The Electric Furnace Construction Company, Philadelphia, announces that the Ford Motor Car Company has placed an order for the largest electric melting furnace ever designed. The furnace will have a capacity of 9000 kva.



AND A NEW YEAR COMMENCES JANUARY FIRST

This is a difficult situation to comment upon. We offer Henry Cahn of the Cahn-Foster Company, Denver contractor-dealers, with a new automobile and a new wife. If the picture had not been taken in the mountains, it might also show the new store which the firm occupies. It might be said that business is picking up in the Intermountain district, as the new car and new store demonstrate. The wife,—well, we leave that to you.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Retail trade was quite brisk during the holidays. All lines of merchandise moved fairly well, and holiday trade on the whole was up to expectations. Business in manufacturing lines is quiet, and there continues to be considerable unemployment. There is a fair amount of building activity, although lumber dealers and builders, and hardware houses do not look for any great increase in trade until February. At the present time, demand for "clears" exceeds production, and prices are slightly higher. Mills are gradually resuming operations.

There is some activity in the export line and demand for space to the Orient is somewhat larger, but conditions are far from satisfactory.

Sales of automobiles have been very slow for the past month or two, and practically no used cars are moving. Dealers, however, are optimistic, believing that present conditions are only temporary, due to the holiday season. Collections continue slow.

SEATTLE

Holiday buying in Seattle maintained an extremely satisfactory level, and the volume of sales made a good showing as compared with 1920. There is no doubt that the volume of sales was slightly lessened by the serious flood conditions existing in the Puget Sound country for more than a week, and which made it difficult and in some cases practically impossible for a large number of the usual out-of-town shoppers to get into the city. The tendency of this year's shopper was the buying of practical and useful gifts, and the sale of electrical gifts, particularly household appliances, was good.

Apple shipments from the north central Washington fruit district for the season to date are now well over 11,000 cars.

Good times are also ahead for the salmon packers in this section, as stocks of all grades held on the coast are low, and it is evident from inquiries coming into Seattle during the past few weeks, requesting prices for January shipment, that buyers from all parts of the country will be in the market early in 1922.

SPOKANE

Wholesale and jobbing trades report a fair volume of business, but collections rather slow and unsatisfactory. Wholesale orders are reported more numerous, but buying is still largely confined to goods required for immediate needs. Retail trade shows some increase, but in volume does not equal that of the same period last year.

In the building line there is more activity than for the corresponding period last year. Nearly \$1,000,000 has been invested in home construction in the past ten months in Spokane. Permits have been issued for 376 new houses, costing \$967,655, as compared with 130 new houses valued at \$492,750 during the same period last year.

In the lumber industry, there is a shortage of shop and high-grade finished lumber of the softer varieties, due to the unusual demand for house building purposes. The demand for other kinds of lumber has not kept pace with that for new houses.

The drop in the price of wheat, which has retarded the movement of that grain, is having a noticeable effect on bank deposits.

SALT LAKE CITY

The outstanding feature in financial circles in the intermountain section was the distribution of the money allotted by the war finance corporation to the sugar companies for the beet growers on November deliveries, involving a total of about \$2,500,000. This will relieve to a considerable degree the needs of the farmers, and particularly the pressure on the country banks, which have depended, in turn, on the city banks for support.

The consumption of copper continues to increase, and the outlook for early resumption of copper mining operations is becoming more and more favorable. Mining operations in the silver-lead camps continue at a fairly satisfactory rate.

In local trade circles the retail merchants report business fair, with collections rather slow. Due to the favorable weather conditions in many localities, and the consequent building activity, the lumber and hardware business is reported to be good.

Electrical appliances are moving fairly well, as a result of intensive sales work and advertising.

PORTLAND

This section has completely recovered from the storms of a few weeks ago and Christmas buying progressed favorably. While it is the consensus of opinion that the volume was good, it did not equal that of last year. General business, shipping, and bank clearings show a slight falling off over the figures of November, while building and industry are well sustained. The unemployment situation is a little worse than during the fall months with prospects of being still worse during January, when some of the logging camps will be inactive. Lumber production is running from 15 to 20 per cent below normal but prospects for considerable activity in this industry during the

spring are very good. Electrical contractor-dealers report sales fair or good with contracting business active, particularly in residence work.

DENVER

Christmas buying got away with a late start with a result that better than 50 per cent of holiday sales in all lines were made during the six days preceding Christmas. Fairly gratifying results were secured by nearly all merchants but the condition which they experienced was a new one. Reduction in prices on most seasonable goods, especially novelties, together with reinforced advertising spreads, it is generally believed, saved the holiday business.

In electrical lines, unusual interest was expressed in laundry equipment and vacuum cleaners. Extensive sales, compared to similar periods the last six months, were reported by nearly all dealers and most of these were for Christmas delivery. Small appliances of standard makes were more in demand than cut-price products. Lots of shopping was done with careful regard for prices which shows, according to local commercial analysis, that even more careful buying will be done in 1922 and that nothing but good salesmanship will produce.

Building is improving and the outlook for the following sixty days indicates a substantial employment increase among local craftsmen. There is virtually no demand for agricultural workers. The closing of the beet sugar season will soon release a considerable number.

LOS ANGELES

New building records for industrial establishments continue to show a falling off, when compared to last year. Dwellings maintain increases sufficient to establish new totals far in excess of 1920. Permits for the first half of December totaled above \$5,000,000. Bank clearings for the week ending Dec. 15th ran \$2,470,000 ahead of the corresponding period last year, recording a total of \$94,625,000 for the week. In the face of great reductions in farm commodities and metal products this is considered a remarkable showing.

Rainfall which overtops the records of the previous five years, comes as a relief to the agricultural sections and will contribute to the replenishing of underground sources and start the cover crops in the stockfeeding sections where the situation was critical.

Retail trade for the holidays was a general disappointment. Rainy days during the week preceding Christmas were held responsible for contributing to the buying delinquency of the public.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

REEDSPORT, ORE.—The Reedsport Light & Power Company has petitioned to be declared insolvent, it is reported.

KALAMA, WASH.—At a recent election here a \$55,000 bond issue was voted for improvements for the Kalama port.

SEATTLE, WASH.—The Northwestern Supply Co., incorporated at \$50,000, recently applied for a change of name to the Tri-State Electric Co.

SPOKANE, WASH.—It is reported that the Great Northern Icing Co. will erect a modern ice manufacturing plant here at a cost of about \$100,000.

PORTLAND, ORE.—More than \$50,000 will be spent for bridge repair work within the jurisdiction of the city in 1922, according to O. Laurgaard, city engineer.

SPOKANE, WASH.—It is reported that the Great Northern Railway is planning to double track 35 miles of road between Wenatchee and Harrington at a cost of approximately \$700,000.

HOOD RIVER, ORE.—It is reported that the Oregon Lumber Co. is contemplating the construction of a large dam just below the Punch Bowl in Hood river for the purpose of developing electric power.

SEATTLE, WASH.—The Miller River bridge in the Skykomish Valley near Berlin has dropped into the river. It is expected that the bridge, which is a 120-ft. span, can be put in place again on new piers.

CANBY, ORE.—The city of Canby has been granted a permit to appropriate 300 sec.-ft. of water from Mill Creek for the development of power. The construction of a municipal light and power system is contemplated.

OLYMPIA, WASH.—The Federal Iron and Steel Corporation, F. M. Handy, J. C. Haas, A. M. Baldwin, Louis Moss and A. H. Stedman, incorporators, recently filed application for incorporation; capital stock \$1,000,000.

EDMONDS, WASH.—The Rainbow Shingle Co. was recently incorporated with a capital stock of \$15,000 by C. L. Miller, Edmonds. The incorporators are M. C. Engles, Wm. M. Arrowwood, C. L. Wiester and E. A. Roe.

COTTAGE GROVE, ORE.—Reductions in the cost of lighting, heating and power service furnished by the Cottage Grove Electric Company have been ordered by the public service commission of Oregon, effective December 20.

OLYMPIA, WASH.—The Edwards Drilling Corporation, Spokane, has filed articles of incorporation, with a capital stock of \$100,000; incorporators, W. W. Edwards, Alfred L'Ecuier, C. J. Galloway, H. L. McWilliams and C. L. Bean.

SALEM, ORE.—The development of 3409 hp. of electric energy for municipal use is proposed in an application for permission to appropriate water from the Malheur river filed with the state engineer by J. Edwin Johnson of Vale, Oregon.

REEDSPORT, ORE.—The Three Rivers Light and Power Company of this city has recently been incorporated for \$50,000, by Stanley D. Chapin, J. R. Browne and J. G. Napier. It is the expectation of the new company to use the distributing system of the old light plant and

to install two Diesel engines for operating generators to supply light and power to the city.

SALEM, ORE.—The East Boswell Mines, Inc., has filed articles of incorporation. The company has a capital stock of \$150,000 and will engage in mining and milling operations. F. A. Fritz, M. Norden, J. M. Scudder, of Portland, are the incorporators.

PORTLAND, ORE.—Following the passage of the special city tax levy for the 1925 exposition, L. Q. Sweatland announced his intention to build within the next year a 12-story, 220-room hotel in the down town district at an estimated cost of \$750,000.

RAINIER, ORE.—The Columbia Wood Products Company, a recently organized corporation with a capital stock of \$250,000, has purchased a site in this city and will begin the erection of the first unit of their plant for manufacturing wood products at once.

SALEM, ORE.—The Willamette Valley Flax & Hemp Corporation, H. E. Bradley, D. F. Eastburn and E. L. Porter, Salem, incorporators, has filed articles of incorporation, capital stock \$100,000. The company will process and manufacture hemp and other products of flax.

SALEM, ORE.—Extension to its municipal water supply at a cost of \$22,500 is contemplated by the town of Myrtle Point, Ore., according to an application for the appropriation of water filed with the state engineer. A reservoir and pipe line are included in the project.

TOLEDO, ORE.—The Pacific Spruce Corporation, it is announced, will shortly open up the big spruce mill purchased from the government. A box factory and planing mill will be built to supplement the government mill which was used during the war to cut airplane stock.

PORTLAND, ORE.—The Columbia Tire Corporation will begin construction immediately on its new tire factory in the North Portland industrial district on a site just purchased. The plant will be electrically operated throughout and will have an installed motor capacity of approximately 600 hp.

SALEM, ORE.—The water board of Eugene has filed application with the state engineer for the appropriation of an additional 400 sec.-ft. of water from the McKenzie river with which to increase the capacity of its present power plant and for the appropriation of an additional 2500 sec.-ft. of water for a new power plant.

BREMERTON, WASH.—Reports of the Navy Department indicate that plans and specifications for the Bremerton seawall and dock are from 80 to 90 per cent complete. The work involves the expenditure of about \$1,100,000, of which \$100,000 will be spent in grading. The cost of the pier is estimated at \$750,000.

SEATTLE, WASH.—The Intercity-Marine Wireless Electric Co., Inc., has filed articles of incorporation, capital stock \$100,000; incorporators, John C. Mitchell, Wm. Wing and Geoffrey H. Lloyd. The company proposes to construct, manufacture, repair, import and export all kinds of electrical and radio apparatus and appliances.

PORTLAND, ORE.—The city council is negotiating a lease of a 20-acre tract with more than 800-ft. water frontage to the Prouty Lumber & Box Co. The lease is to run 50 years and the company agrees to immediately erect a sawmill and box factory on the site and to keep it or some similar industry in operation continuously during the life of the lease. The saw-

mill will have a capacity for 100,000 ft. daily output and the proposed plant, including the box factory, would cost approximately \$150,000, giving employment to about 200.

McMINNVILLE, ORE.—The city of McMinnville has been granted a permit to construct an impounding reservoir to store 5900 acre-ft. of water from Nestucca river and Walker creek and to appropriate 35 sec.-ft. from this reservoir for the development of power for municipal use. The project contemplates the development of 5979 hp. under a head of 1460 ft.; impulse wheels and electric generators to be utilized; development in two units; pipe line 5 miles long. Total cost of project is estimated at \$250,000.

THE INTERMOUNTAIN DISTRICT

DENVER, COLO.—P. J. Sullivan and Alex Simpson have started work on the superstructure of the first unit of the million-dollar Presbyterian hospital.

FORT MORGAN, COLO.—A new ice plant and cold storage warehouse is being constructed here by Thomas C. Ekrem and Charles W. Bessee of the Denver Ice and Cold Storage Co.

DENVER, COLO.—The Beatrice Creamery Company is working on plans for the complete electrification of its plant in this city. Engineers estimate that a 900-horsepower load will be necessary.

LOGAN, UTAH.—Bonds in the sum of \$375,000 for the conservation of water in Cache county district No. 1 were voted on December 12th in Petersboro and Cache Junction at a bond election.

OGDEN, UTAH.—A building permit has been issued to the Taylor Building Company for the erection of an 88-room apartment house on the northwest corner of Twenty-seventh street and Hudson avenue. The building will cost \$60,000.

DENVER, COLO.—Another modern store building will be erected immediately in the uptown district by the Powers-Behen Company, one of the large clothing and men's furnishing establishments. According to George Williamson, the architect, the cost is estimated at \$60,000.

DENVER, COLO.—A completely equipped electric smelter, to be the largest in Colorado, will be built in this city shortly by the Utah-Colorado Mining and Milling Company, according to Charles E. Havener, the president. It will be electrically equipped throughout and will cost about \$10,000,000 when completed, the engineers of the company announce.

THE PACIFIC CENTRAL DISTRICT

OAKLAND, CAL.—The Producers Milk Co., has filed articles of incorporation, capital stock \$250,000. The directors are W. Hotchkiss, J. Costa and E. Hirsh.

HAYWARD, CAL.—The city trustees have decided on an electrolier lighting system for the entire city at an estimated cost of \$60,000.

RICHMOND, CAL.—Additions to the plant of the Pacific Sanitary Mfg. Co. have been announced by J. D. Cameron. The improvements will cost approximately \$60,000.

SACRAMENTO, CAL.—Reclamation District No. 2022 has made application to the State Reclamation Board for the approval of plans for the remodeling of pumping plants, construction of ditches and various other work incidental to irrigation, to cost approximately \$21,000.

SACRAMENTO, CAL.—Plans have been drawn for a new ice and cold storage plant to be erected at 30th and S Streets, Sacramento, for a company headed by A. B. Atkinson, of the Oak Park Lumber Co. The plant will cost about \$75,000.

MARTINEZ, CAL.—The Union Oil Co., of California has purchased 36½ acres of land adjoining its present holdings and it is understood that the property will be used for the construction of additional tanks.

LODI, CAL.—Articles of incorporation have been filed by the Industrial Manufacturing Co. The company intends to establish a pumping machinery plant and is capitalized at \$200,000. The directors follow: Dean H. Thompson, H. Stark and Wm. C. Allen, Lodi, John F. Gormley and Lee Jones, Stockton.

MERCED, CAL.—A. B. Ruddle and associates have taken over the Leigh Ingalsbe place of 520 acres in the northern part of the Merced Irrigation district. Pumping plants and reservoirs will be placed on these ranches and they will be planted and subdivided.

HILMAR, CAL.—The Hilmar Preserving Company will incorporate for \$100,000 in order to increase their capacity in the coming season.

SAN FRANCISCO, CAL.—The Adam Arras Co., 185 Stevenson St., has been awarded a contract for the construction of a two-story concrete building to be erected on the north side of Folsom St., for the Bothin Real Estate Co. The building will be used for an electrical supply shop.

SAN FRANCISCO, CAL.—Sealed bids will be received until 3 p. m., Jan. 4, for steel rails, joints and track materials for the municipal railway system. (Contract No. 127.)

SAN MATEO, CAL.—The Doble Motors Corp., manufacturers of the Doble (steam) automobile, has conferred with the Three Cities Chamber of Commerce with regard to the cost of a plant in Burlingame, east of the Southern Pacific Co. right-of-way, near Easton. A \$300,000 plant is contemplated, according to G. H. Landfield.

SUSANVILLE, CAL.—A cyanide plant is to be installed at the Osterbloom quartz mine, located in the Milford mineral zone, according to announcement recently made by A. J. Osterbloom.

SAN FRANCISCO, CAL.—Contract for the construction of a one-story reinforced concrete addition to the ice plant of the Pacific Express Co., at Calwa, Cal., has been awarded to D. Wagner, Call Building. The plant, which will be completed in four months, will cost \$85,000.

PLANADA, CAL.—The N. E. Beckwith Company has purchased a site and signed a contract to erect a modern preserving plant here. The California Packing Corp. will also build a cannery.

SACRAMENTO, CAL.—At an election held Dec. 21 a favorable vote was cast for a bond issue of \$900,000 to complete the new filtration plant, also for \$200,000 for waterfront development.

MADERA, CAL.—E. Y. Foley is contemplating the erection of a brick packing house to cover an entire block. The location has not yet been determined.

MADERA, CAL.—The Madera and Medano Irrigation Districts have joined their interests in the development of the waters of the Chowchilla River. Thos. Means, engineer, states that the Buchanan dam will impound 50,000 acre-ft. The first block of the bonds has been sold and the plans for the entire project will be ready in the near future.

FRESNO, CAL.—W. P. Fuller and Company are contemplating the erection of a building for the paint and glass business of the company in this territory. Architect Eugene Mathewson is preparing the plans.

FRESNO, CAL.—The greatest single project of an industrial nature to enter this locality is the Sugar Pine Lumber Company now beginning the erection of a mill in the city. The tract of land to be improved with buildings and machinery is 500 acres. A 40-mile railroad is to be constructed back into the timber holdings in the Sierras. Approximately \$5,000,000 will be expended in the entire development.

THE PACIFIC SOUTHWEST

LONG BEACH, CAL.—The Utah Fuel and Iron Co., will erect a factory in the local harbor in February.

UPLANDS, CAL.—Old Baldy Citrus Association will erect a lemon packing house to cost \$100,000.

SAN PEDRO, CAL.—Two new units will be added to the San Pedro High School building at a cost of \$118,000.

HIGHLAND PARK, CAL.—A three-story and basement school building will be erected at Eagle Rock and 62nd Ave.

AZUSA, CAL.—Plans are nearly completed for the Citrus Union high school building and bids will be called for in a few weeks.

LOS ANGELES, CAL.—The Kroyer Motors Co., a \$5,000,000 Stockton concern, is planning on building a plant in Los Angeles in 1922.

LOS ANGELES, CAL.—A Mormon Temple to cost \$500,000 will be erected at Ocean Park Heights on land donated by Harry Culver Co. of Los Angeles.

ANAHEIM, CAL.—The plans for the new \$75,000 city hall are being drawn by architects T. C. Kistner of San Diego and M. Eugene Durfee of this city, associated.

LONG BEACH, CAL.—The Kimball Motors Co., through O. C. Hull, vice-president, has announced that a factory will be built upon a site purchased north of Willowville.

SAN BERNARDINO, CAL.—H. S. Williamson, district manager for the Southern California Edison Co., will install buildings and new substations here to cost \$200,000.

SANTA FE, N. M.—Chas. Clay, owner of the Hotel Clay at Jemez Springs, will erect a \$50,000 pueblo style hotel building below Soda Dam. John D. Hughes is the architect.

BURBANK, CAL.—The Western Glass Products Co., will erect a factory here in the near future, to be located adjoining the American Aluminum Co., and Empire China Factory.

LONG BEACH, CAL.—A church building to cost \$75,000 will be erected by the Methodist Episcopal church at Miramar, Terminal & Eliot Sts. John Parkinson is architect for the building.

LOS ANGELES, CAL.—A two-story brick factory building will be erected at 713-17 S. Flower St., by Charles W. Bean, contractor, to cost \$40,262. The owners are the C. C. Brown Candy Co.

BLYTHE, CAL.—A total of \$200,000 in bonds will be sold by the Palo Verde Drainage District to develop the drainage system. The work is to be carried on as rapidly as material can be supplied.

SAN PEDRO, CAL.—A 5-story hotel to cost \$150,000 is to be erected at Sixth Street and Pacific Avenue, by Phillip M. Stone of Pasadena. The plans will be ready for inspection in a few days.

SAN PEDRO, CAL.—A large addition to the transit shed facilities will be built at once, according to plans announced by the Harbor Board. The new shed will be erected on Terminal Island. It will occupy a ground space of 109 by 600 ft. The cost is estimated at \$215,000.

LOS ANGELES, CAL.—A 10-story loft building is to be erected at 932 So. Broadway by A. B. Cohn. Weeks and Day are the architects and the leases are being handled by A. C. Blumenthal and Company.

HERMOSA BEACH, CAL.—It is rumored that the Chamber of Commerce has under consideration an offer by outside parties to erect a \$250,000 hotel in this city if the ground is provided by local authorities.

LOS ANGELES, CAL.—Morgan, Wells & Morgan, architects, have been commissioned to prepare plans for a 12-story Class A bank and office building to be erected by the Bank of Italy, northwest corner of Seventh and Olive Streets.

RIVERSIDE, CAL.—The Monta Vista Citrus Association, through its manager, has announced that a \$30,000 lemon packing house will be built at 3rd and Vine Streets. The contract was awarded to the Cresmer Mfg. Co.

HOLLYWOOD, CAL.—Holbrook & Ingalls are the architects for a two-story, 10-room Class C school building to be erected in the Logan district. Provision is also made for an auditorium. The cost is estimated at \$76,000.

SAN DIEGO, CAL.—Plans for the new post exchange and dispensary building at the Marine base are ready. The structures are to be thoroughly fire-proof. No estimate of the cost is available. The date for bids has not been announced.

HUNTINGTON PARK, CAL.—The rapid increase in the demand for water forces the city to make provisions at once for additional capacity. Approximately \$75,000 will be expended in new wells, pumps, and mains to relieve the situation at an early date.

LONG BEACH, CAL.—According to the announcement of Col. Charles R. Drake, president, the Long Beach Bath House and Amusement Company will start at once with the erection of a 6-story office building and theater which will cost \$600,000 when completed.

OXNARD, CAL.—The sum of \$290,000 will be expended by the Las Posas Water Company and two mutual districts yet to be organized. It is proposed to develop 500 miner's inches and use this water on 4,000 acres not now supplied with sufficient irrigation facilities.

AZUSA, CAL.—Anticipating the continued growth in the consumption of gas in the district in and around this city, the Southern Counties Gas Company of California is erecting a new 100,000 cu. ft. gas holder here. The engineers in charge of construction for Baker Iron Works believe that all work will be completed by February 1st.

LOS ANGELES, CAL.—Two reinforced concrete warehouses, each one to be 4 stories and basement, will be built in the north part of the city near the railroad yards. Architects Parkinson and Parkinson give the cost of these structures as estimated at \$1,500,000. The plans will be ready the first of the year.

LONG BEACH, CAL.—George W. McIntyre and C. E. McIntyre are having plans prepared for a 12-story hotel to be located on Ocean Boulevard near American Avenue. It will be operated in connection with the Long Beach Auto Tours System also owned by the McIntyre interests. Harvey H. Lochridge is preparing the plans.

SAN PEDRO, CAL.—It is announced that the syndicate headed by E. G. Lewis of Atascadero, Cal., will make the regents of the University of California, Southern Branch, an offer of \$1,000,000 and 1,000 acres in the event that the University is moved to the Palos Verdes Ranch property which the syndicate is about to open. This property will be developed along exceptional lines. The sum of \$35,000,000 is said to be the figure named by the Board of Engineers as the amount necessary. H. T. Cory heads the board as chief engineer.



Mottoes for the Wife Saving Station

We have long admired the chiropodist who attracts the passing trade with the quotation, "Hell hath no fury like a woman's corn."

Several equally brilliant suggestions are now available for the electrical contractor-dealer who affects a literary bent. From the East comes the following suggestions for vacuum cleaner advertising:

"Sweep no more my lady, sweep no more today."

Or, paraphrasing Burns—

"Man's inhumanity to woman makes countless thousands sweep."

For the electric washing machine, Tennyson offers a happy thought:

"Wring out the old, wring in the new."

Or why not this suggestion from a Butte paper?—

"The steps I took with thee, old broom,
Are as a swirl of dust to me;
I count them over as I cross the room—
My rotary (action, ball bearing suction sweeper),
My rotary."

* * *

How to Grow Rich

The following practical method of household accounting is offered for the use of the enterprising contractor-dealer and small business man by H. W. Davis as one of his "Pomes and Sunflowers." We suggest only that the last line be changed to read "Profit." Otherwise the system is ideal.

Rent	\$30.00
Groceries	42.87
Shoes (1 pair)	14.00
Suit (man)	35.00
Coat (wife)	85.00
Hat (wife)	21.99
Gas and electricity.....	8.22
Coal	15.00
Payment on Victrola.....	10.00
Payment on gas range.....	3.00
Car fare	4.00
Movies	10.00
Church .....	.40
Tobacco .....	.65
Total.....	\$280.13
Salary	\$100.00
Note	200.00
Total.....	\$300.00
Balance.....	\$ 19.87

* * *

What Methusaleh Missed

It has been calculated that if there had been an electric utility company in Methusaleh's home town and if he had invested \$1.00 in securities at 6 per cent interest when he was 21 years of age and had reinvested his earnings annually,

his wealth would have amounted to \$977,157,910,641,000,000,-000,000.04 at the age of 969, when he died.

And it is further estimated that if it had passed on to father and son from that time to this, under the excess profits and inheritance tax now in vogue, Solomon Methuselah, who now owns a second-hand store on the corner of Center and Fifth, would have received \$1.04 as his share, of which all but the four cents would be owing to the government.

* * *

From Our Chinese Correspondent.—The Hongkong and Shanghai Bank of Peking is ornamented with a large square clock tower, displaying four clock faces, no two of which are ever known to show the same time. In lighter Peking circles this is known as "the bank where the wild time grows."

* * *

ELECTRICAL HYBRIDS



XVIII—The Electric Bell Hop

Electric Bell hops will respond
Whenever you may ring.
Of buttons they are very fond
And tips and everything.

When pressed for service they rebel
And strike repeatedly—
Just touch their buttons and they yell
A charge of battery.

Journal of Electricity and Western Industry

25 Cents a Copy

January 15, 1922

San Francisco

PERMANENCY in transmission line construction has become the most important issue in the great hydroelectric development program now unfolding in the West.

The investing public should expect the installation of transmission equipment to have as long a life as the bonds which they buy.

The high tension line illustrated is a fine example of *efficiency, permanency and security*. It is operated by The Phelps Dodge Corp., between Douglas and Bisbee, Arizona, and is built with BATES EXPANDED STEEL POLES.

BATES Expanded Steel Poles possess maximum strength with minimum weight—and they last indefinitely. Stocks for immediate delivery are constantly on hand. Get in touch with our engineers in the sales office nearest you.

Bates **E**xpanded **S**teel **T**russ **C**o.

208 So. La Salle Street, Chicago, U. S. A.

Western Sales Offices

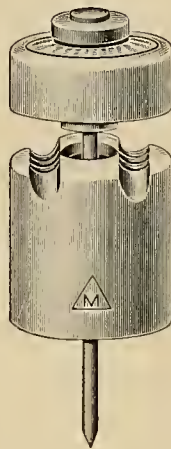
Denver, 1633 Tremont St.; Salt Lake City, 59. W. Broadway; San Francisco, 589 Howard St.; Los Angeles, 616 Title Ins. Bldg.; Seattle, Hoge Bldg.

Other Sales Offices in Boston, Rochester, Syracuse, Buffalo, Philadelphia, Pittsburgh, Columbus, Indianapolis, Milwaukee, St. Louis and Minneapolis.





Starting the Year Right with —



“BULL DOG” KNOBS

Starts *you* right---they have a grip like their namesake.

They are now put up in rugged boxes of 500 ---also barrels---insuring minimum breakage and maximum convenience.

Ask for the “Bull Dog”---Three Pacific Coast Stocks.

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILL.

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, JANUARY 15, 1922

NUMBER 2

Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1921, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Power
Coal Age
Electrical World
Bus Transportation
American Machinist
Ingenieria Internacional
Electrical Merchandising
Electric Railway Journal
Engineering News Record
Engineering and Mining Journal
Chemical and Metallurgical Engineering
Electrical Review and Industrial Engineer

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

45

What the Disarmament Conference Promises for the West—A National Program that Means Much to the West—The Handwriting on the Wall in Canada—Eastern Inaccuracies of Western Origin—Beware of Losing the Confidential Contact—The Recent A. S. M. E. Conference at New York—Discontinuing the Airplane Forest Control.

Business Research—Its Necessity, Methods and Results

51

By E. H. TUCKER

How the business depression of the past year has demonstrated to the business man the necessity of business research.

Difficulties of Transportation to Mountain Power Projects

53

By REX C. STARR

How the ingenuity and daring of engineers in handling and forwarding materials expedited the construction of the Kerckhoff Dam.

Changes in the Mechanism of Distribution Now Under Way

55

By E. A. KINCAID

How the present distribution system has been affected by conditions arising from the pressure of increased commodity prices.

Use of Artificial Daylighting in Industry and Commerce

57

By G. H. STICKNEY

The varied uses of artificial daylighting in industrial processes and in stores, particularly for color matching.

Western Hydroelectric Construction Under Way or Definitely Projected for 1922

60

The Birthplace of Hydroelectric Generation in the West—Frontispiece

42

Western Comment on Current Events

46

Letters to the Editor

48

Radio Bulletins

49

Builders of the West—J. G. McDonald

50

World Records of the West—From 10,000-v. to 220,000-v.

59

Self Improvement in Salesmanship

62

Increasing Production in Industry

64

Western Dealer, Jobber and Agent

65

Activities of the West

68

Meetings of Interest to Western Men

73

Personals

74

Manufacturer, Dealer and Jobber Activities

76

Business Outlook in Western Market Centers

77

Construction News and New Industrial Developments

78

Salvage

80

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of CALIFORNIA, Rialto Building, San Francisco

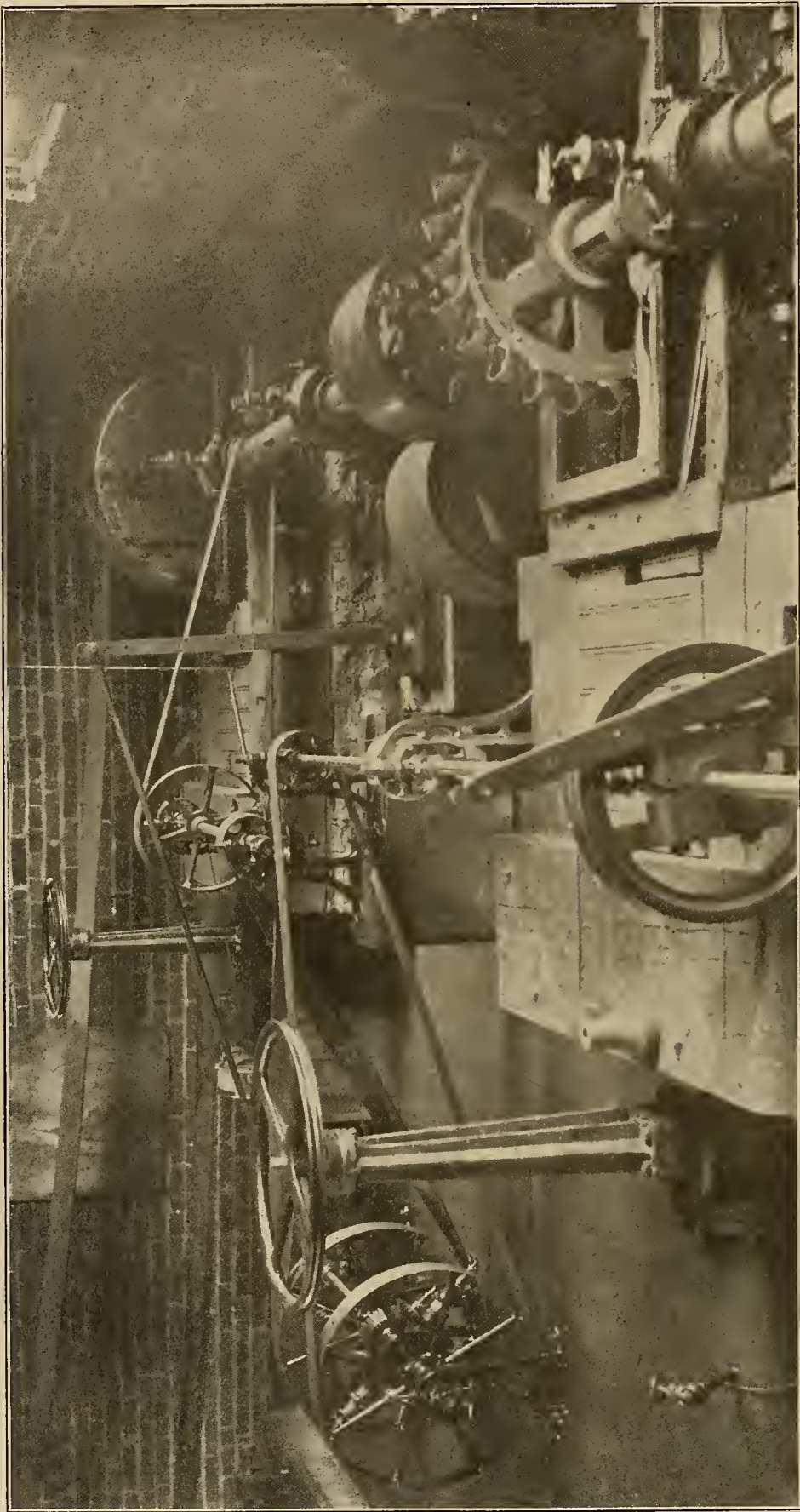
James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



THE BIRTHPLACE OF HYDROELECTRIC GENERATION IN THE WEST

IN 1885 the Aspen Electric Company of Aspen, Colorado, installed what is claimed to be the first hydroelectric plant in the United States, at the smelter of the Aspen Mining and Smelting Company. This pioneer installation consisted of a 60-light Brush arc dynamo belted to a Pelton wheel under a 70-ft. head. The view shown above is a plant established in 1887 by the Roaring Fork Electric Light and Power Company, the successor of the Aspen Company. The Pelton wheel in the foreground was used to drive a Westinghouse alternator carrying a load consisting of incandescent lamps. This load varied so gradually that it was easy to maintain the speed nearly constant either by hand or by an old-style Woodward governor. The

wheel in the corner drove a 100-kw. Edison bi-polar 500-volt generator supplying power for a number of electric hoists. The changes in the load were sudden and great. To overcome racing and regulate the speed of the generator the installation was equipped with a differential governor. The rate at which the governor acted is proportional to the difference in speed between the two water wheels; that is, it worked quickly for a large change in load and slowly for a small change, thus keeping the speed of the wheels fairly constant. The impulse wheels here shown which were the finest in their day, are but toys compared with the modern wheels of the same type which weigh twenty-five tons when assembled.

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 2

SAN FRANCISCO, JANUARY 15, 1922

Per Copy, 25 Cents

What the Disarmament Conference Promises for the West

TO a world grown impatient of diplomacy, the disarmament conference called by President Harding at Washington has offered an inspiring picture of divergent races and folk of alien interest sitting about one table and expressing sincerely—and it almost seems for the first time in all this tangle of war settlements—the willingness to sacrifice something of their selfish ends for the common good.

It was the privilege of the editor of the Journal of Electricity and Western Industry to hear Sir Arthur Balfour, chairman of the British delegation to the Washington conference, when he said: "He who proposes cooperation must be willing to set the example by sacrifice. Your country has set an example of such practical sacrifice to bring about disarmament that the nations of the world are ashamed to do aught else but follow your lead. Other developments of far-reaching consequence in the advance of the peoples of the earth are bound to follow." The words swept to enthusiasm the great audience which heard him, and the impression of sincerity and good faith—of all that is farthest from the dark ways of early diplomacy—will remain to those who heard the words as a great hope.

To the West, the conference has already stamped itself as the most important event of recent years. The four-party guarantee of peaceful progress on the Pacific has shunted into positions of secondary importance such minor irritations as the Japanese issue in California and other western commonwealths. There have been

times during the past few years when it has seemed that all the vaunted opportunities awaiting development upon the shores of the Pacific would be swept into the conflagration of racial controversy fostered by an inflammatory press.

The primary essential to a prosperous Pacific is a peaceful Pacific. There still remain—and will arise in the future—differences between nations and races which must be settled, but with recognized fair dealing as the basis for settlement, there is no reason why their discussion should cloud international friendliness.

One European authority has recently written, "The heirs of Europe are the United States and Japan . . . The Pacific Ocean, long out of touch with commercial centers, . . . is awakening to independent life. Her shores that, for a century, had turned, one to the West and the other to the East, now look to each other, and are becoming the coasts of a new Mediterranean."

With the inevitable long period of recuperation, before Europe can again take its normal place as an absorber of our surplus products and the tremendous awakening which the Orient has shown, it is obvious that for the United States in particular, the sun is beginning to rise in the West. And to the continuing spirit of international sacrifice for which Secretary Hughes has set the example, we may look that this scientific phenomenon presage a day of sunshine indeed—and not the thunder-storm.

A National Program That Means Much to the West

AT times we become so absorbed in following the wonderful accomplishment for our industry that is being brought about by the Pacific Coast Electrical Association and the Northwest Electric Light and Power Association that we are prone to overlook the substantial work for the West that is being accomplished by the parent body—the National Electric Light Association.

A listing of a few of the outstanding present activities of the national association should as a consequence prove interesting and instructive to western men who have at all times given such loyal support to the association, even though at certain periods the net returns to the West seemed inadequate to meet the outlay involved.

Foremost in national engineering effort of vital interest to the West, is the splendid work on induc-

tive interference that is continually being accomplished in the national association by its engineering specialists, among them being W. J. Canada, a national authority, devoting his entire time to this work.

Following closely upon this work in importance is that of Mr. Herbert, who is bringing about standardization in accounting that is timely and helpful. In the states of Washington, Oregon and California at the present time the question of uniform action in handling depreciation is of utmost importance in view of certain activities of the Federal Water Power Commission which seem unjust and economically unsound to western development, comment upon which is made editorially elsewhere in these columns.

An activity of tremendous import to industry generally was the water power conference held at Washington during the past season under the aus-

pices of the National Electric Light Association, in which national leaders of all branches of industry appeared before the Federal Water Power Commission and presented the necessity for definite policies in national water development. This forceful presentation carried a message home to the commission and to the people at large that can not fail to net helpful results. This complete symposium has been published by the association and its contents constitute an important contribution to our present day knowledge of the subject and its importance to industry at large.

After a year's careful study the association has drafted a model state law for commission regulation which should prove helpful in states where such laws do not at present exist or where amendments to present laws seem desirable.

National publicity on electrical matters is still fostered by the national association and some seventy-five thousand dollars will again be spent for national advertising. Particular emphasis is being stressed upon receiving additional advertising of the indirect type which appeared some months back in Collier's connected with the Providential Insurance Company. Along with this publicity is the theater exhibit of "Little Kilowatt" which is being exhibited in hundreds upon hundreds of moving picture theaters throughout the nation.

A new department is that of introducing economic courses in colleges and universities dealing with the discussion of public utility problems. A number of universities—among them Columbia, Chicago, Iowa and the University of California—have already held a series of public lectures given by outstanding executives in the public service industry.

Other activities deal with the forwarding of state laws to enable the three hundred or four hundred million dollars annually accumulated in savings banks to become available for possible use in hydro-electric securities, but foremost and above all a deep study is being given to how best a national movement may be instituted to put over completely the national customer ownership idea.

All these matters are of tremendous import to the progress and rise of the public service industry. They take money to carry them on and the West shares in the general resulting good from these national accomplishments. The progressive spirit which has done so much in forwarding the electrical industry west of the Rockies is in full accord with the splendid work of the National Electric Light Association and stands ready to continue and to further its substantial support of the past.

The Handwriting on the Wall in Canada

THE recent election returns in Canada which indicate that the Liberals appear to be coming into power with 235 seats as compared with the 50 held by the Conservatives, augurs much for a return of sanity in a situation which has recently become highly involved. It means that in Canada there will

be less governmental interference with private enterprises during the years immediately ahead. Along with this thought, it is interesting to follow the announced policy of Premier Drury of the Province of Ontario that he will, of course, see the Hydro Electric Commission of Ontario through in spite of the enormous additional outlays of money that are being required for the Chippewa Development, but in matters of proposed axial electric railway lines paralleling existing steam roads, he will not lend his influence.

There is much for us to learn from this experience in Ontario, Canada, in recent years—much that might be helpful for us to imitate and much, vastly much, more that we should avoid.

Eastern Inaccuracies of Western Origin

THERE has been much criticism of the Edison questionnaire. Many of these questions, such as "Give the states bounding Idaho," or "What is the capital of Pennsylvania?" were generally ridiculed by the press and declared to be either matters of such common knowledge or of such uselessness in application as to be unbecoming serious consideration by a man of Mr. Edison's attainments.

If anyone doubts the general misinformation of public or even of business men who ought to know better, try out some of these questions on a few friends in other sections of the country and note the result.

So far as the eastern conception of the West is concerned, the gross ignorance that prevails is truly amazing. Great newspapers of Chicago, for instance, published recent pictures of the football stadium at Seattle seating 30,000 people and heralded this broadcast as the greatest stadium of the West, evidently ignorant of the Stanford stadium and its 60,000 capacity. Again, one of the great dailies in New York showed a picture of the Longlake dam of the Washington Water Power Company which they state is near Spokane, Washington, and yet they follow it by saying that this power plant furnishes Seattle with its major power supply, supremely ignorant of the fact that Spokane is hundreds of miles to the east of Seattle.

The literature one finds for public distribution concerning the West is so faulty, inaccurate and untruthful it certainly makes one blush to feel that with all our modern drive for accuracy and truth in presentation, the goal of attainment is so far from being accomplished.

The eastern papers can only be corrected by their own effort, but so far as the West is concerned we ourselves can play a helpful part in this by seeing to it that more accurate statistical data is sent out and that uniformity of statement is observed in the various pamphlets and promotional matter that is sent forth. This is a matter for joint action of chambers of commerce of the West and if they fail in this duty, then a vigilance committee ought to originate among the well-wishers of the West and the matter be taken into their own hands.

Beware of Losing the Confidential Contact

THE Federated American Engineering Societies propose the formation of an employment bureau to render employment service on a commercial scale—that is, the engineer who secures a position is to pay a definite percentage of his first year's salary for the service rendered. Hitherto local engineering clubs have performed this service gratis, as have also many of the national engineering societies. This relationship has indeed in many instances done much to foster the confidential contact of the particular organization with the membership at large. Under no circumstances should this service be done away with or lessened in its activity due to the proposed broader activity of the Federated Societies. However, anything that can be done to facilitate the continuous employment of engineers is to be welcomed, and all recognize that in the main it would be better that this activity be self-supporting. Hence, we commend the Federated American Engineering Societies for their announced advocacy of this new undertaking and urge upon member engineers to give the movement all the support the movement needs to make it a success.

The Recent A. S. M. E. Convention at New York

WITH its membership roll containing the names of men of achievement from all branches of engineering, the American Society of Mechanical Engineers has assured for itself a special position of national importance in engineering circles. It is doubtful if any other of the great national engineering societies can boast of the brilliant gathering of noted engineers which today marks the annual convention of the A. S. M. E.

At the recent gathering in New York City, the conduct of the meetings and the personnel in attendance were unusually impressive. E. S. Carman, the outgoing president, Wm. H. Kenerson, chairman of the Local Sections Committee, and Calvin W. Rice, the secretary of the Society, were undoubtedly largely responsible for the snap and ginger with which things moved.

It is particularly gratifying to a westerner to recall that the incoming president, Dexter S. Kimball, although now Dean of Engineering at Cornell University, is a product of the West. Among the traditions of the good old days at the Union Iron Works of San Francisco is that of the efficient workmanship of the now famous Dean Kimball, then a young man working at a lathe in the shops in order later to complete the course in mechanical engineering at Stanford University.

The American Society of Mechanical Engineers, now fifteen thousand strong, financially sound and with a gross income of half a million dollars, stands without a peer among engineering societies. May the coming year under the leadership of Dexter S. Kimball, develop its promise of unparalleled achievement!

Discontinuing the Airplane Forest Patrol

AS a part of the Dawes economy curtailment, Congress has cut off the appropriation which made it possible for the Aviation Service to cooperate with the Forest Service in maintaining the airplane patrol of the National Forests that has been so effective in the past two summers. Those who are acquainted with the great aid rendered in preventing fires and preserving the timber of the National Forests know that a curtailment of this sort is false economy, because without the air patrol the country stands to lose timber of value far exceeding the cost of maintaining the patrol.

In the issue of the Journal of Electricity and Western Industry of October 15, 1920, practically the entire editorial pages of the issue were given over to this important work in the West and great stress was there laid upon the value of the airplane in the prevention of forest fires. Since that time many occasions have served to strengthen the conviction of those who have the conservation of our great forest reserves nearest at heart that this protective work must under no circumstances be dispensed with.

Officers of the Aviation Service are anxious to have the forest patrol continued because it affords a "field service" training for pilots and observers that is more practical and hence more effective than a corresponding number of "hours in the air" over landing fields at flying schools. After a season on forest patrol work an aviator is accustomed to cross-country flying and has had experience under conditions that closely resemble war-time duty.

The Forest Service is convinced that the Air Patrol is a very valuable agent in forest protection, first, through supplemental aid given in the detection of fires; second, in making a reconnaissance of large fires and in some instances directing the fight from the air through radio; third, in the quick transportation of fire fighters from other parts of the forest territory; fourth, as an agent in public education on fire patrol. The saving in the mere expense of fighting forest fires has been reduced by many thousands of dollars annually on the Pacific Slope through the aid of the airplane.

However, it should be remembered that the people's interest is far greater than the interest either of the Aviation Service or the Forest Service and that the training of aviators and the cost of fighting fires, which in themselves seem to be good and sufficient reasons for continuing the air patrol, are exclusive of and in addition to the fundamentally important consideration of conserving our timber resources. There is no citizen of the west coast who is not in some way, directly or indirectly interested in our forest resources or their products. If the need and will of the people can be shown to be contrary to legislative enactment, we have faith enough in Americanism to believe that the offending measure will be changed.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Montana Mines to Resume Operations

Long Period of Idleness to Close With Opening of Copper and Zinc Plants on January 16, According to Announcement

ENFORCED shutdown of the copper and zinc industry of Montana which has obtained since April last, owing to the depression of the metal market, will be ended on January sixteenth, according to a formal statement issued by the various companies operating in that district. Eleven companies will resume operation on that day, under a somewhat lower scale of wages but with the assurance of permanent employment.

This involves not only the greater number of the mines, but reduction works as well. The Anaconda Company further announces that it has completed arrangements to purchase zinc concentrates in such quantity as to produce six or seven million pounds of zinc at the electrolytic zinc plant at Great Falls. With the purchase of the American Brass Company by the Anaconda Company, it is felt that a factor of stability has been introduced into the situation which means much to the copper industry, as this concern consumes an amount of copper and zinc in excess of the capacity of the Butte camp.

The present reopening of the copper plants marks the end of what has undoubtedly been the worst depression ever experienced by this region. With surplus stocks reduced and other factors which make for a healthy state of the metal industry, it is expected that the Intermountain district is now in a position to grow steadily in prosperity in all fields.

Shipping Pool Plan for Pacific Ports

Tentative Plan For Joint Operation of Ships by Coast Cities Receives Endorsement of Local Chambers of Commerce

PLANs for a combination of all Pacific Coast shipping interests to pool allocations of Shipping Board vessels have created much interest in Pacific ports. The proposal comes from Herbert Fleishacker, president of the Anglo and London Paris National Bank of San Francisco, as well as vice-president of the Great Western Power Company, who was recently called to Washington to consult with the shipping board on some method of solving the shipping problem.

According to the proposed plan, the Shipping Board vessels would not be assigned to any particular port, but would go to the shipping combine,

which would cover the coast from Puget Sound to San Diego and would operate along the lines of the International Mercantile Marine on the Atlantic coast.

Although details of financing the plan have not been announced, it is understood that all shipping interests will be invited to enter the \$30,000,000 pool to purchase ships from the Shipping Board. Twenty ships have been suggested as necessary to present Pacific coast needs. These would ply out of the larger ports of the Pacific coast and would make two sailings a month from each port, operating on the trade routes between coast and Oriental ports and along the west coast of South America. The home ports will be San Diego, Los Angeles, San Francisco, Portland and Seattle. It is reported that favorable action in supporting the proposition has been taken ports will be San Diego, Los Angeles, San Francisco, Seattle, Tacoma, Los Angeles and San Diego. Portland had appointed a committee for its consideration but had not taken action at the time of our going to press.

This suggestion offers a possible way out of the general dissatisfaction and turmoil which have resulted from the recently announced allocation of vessels to Pacific ports and is finding general support in coast shipping circles.

The California Oil Situation Outlined

Increase in Producing Area Will Not More Than Maintain Past Production, Says State Mining Bureau Expert

OF value in estimating the importance of saving oil through hydroelectric development, is the recent report of the California State Mining Bureau in which the extent and producing possibilities of the proved oil lands of that state are analyzed by R. E. Collom, State Oil and Gas Supervisor.

California production of oil for 1921 will be close to 114,000,000 bbl., the largest of any year on record. Figures given for acreage and producing wells indicate that proved oil lands have increased from 80,762 acres in 1916 to 94,567 acres in 1921, producing wells during the same period growing from 6,409 to 9,642. Production figures range from 87,073,195 bbl. in 1916 and 103,184,724 bbl. in 1920 to the figure given above. Part of the acreage added has come from new developments in fields already producing. In some cases, on the other hand, land formerly classified as proved oil land has been removed from this classification when drilled.

The bringing in of the Montebello oil field of Los Angeles county accounts for the greatest increase in production. Other fields opened for development since 1915 are the Casmalia, Richfield, Ventura, South Mountain, Elk Hills and Huntington Beach. Together new fields have yielded 52,075,378 bbl. of oil, which is 11% of the total oil produced.

The development of these new fields and the further development and addition of proved acreage to old fields, however, has done little more than maintain the state's production. Although during the past summer there was an overproduction, due to the flush production in the new Elk Hills area, it is questionable whether the state's output will be as successfully maintained during the period 1921-1926, inclusive, as during that of 1915-1920.

Mexican oil, to which we have looked to make up our national deficit in oil production, is recognized as nearing exhaustion, and with the burden on local production inevitably largely increased in the next decade, hydroelectric development must be ready to meet the growing needs of western industry.

Denver Eight Cent Car Fare Sustained

Old Controversy on Validity of City Franchise
Restrictions Settled by U. S. Circuit
Court in Favor of Higher Fares

PERMISSION to establish an eight-cent maximum fare is involved in the order of the United States Circuit Court of St. Louis which confirms the action of District Judge Lewis of Denver, granting the Denver tramway company an injunction against the city and county of Denver.

The court held that a city franchise ordinance, which provides for a maximum six-cent fare, was not in the form of a contract and if there were a contract, it would be void because of lack of mutuality. The company is in the hands of a receiver.

The present case grew out of the anomalous conditions of a year or two ago when the company was unable to meet the demands for higher wages of its striking employes, owing to the fact that it was not allowed to raise its fares by the city government, who, nevertheless, required that service be given. The entire mix-up was an example of the dangers and ignorance involved in local regulation—and the decision of the court which confirms the action of the Denver court is welcomed as preventing further costly absurdities.

West Coast Neglecting Southern Trade

Improved Credit Situation in Mexico and South
America Offers Opportunities Which
Pacific Coast Is Neglecting

THAT Pacific Coast business men are not taking advantage of the trade opportunities opened to them in Mexico and South America, is the report brought back by manufacturers and Chamber of Commerce men recently returned from that district. Since the steamship connections have been established between Pacific Coast ports and Baltimore,

western goods are being distributed to some extent as far east as Mexico City as cheaply as goods can be delivered from New York. There are, however, few western sales representatives to be seen in this district and at a recent meeting held by the American Chamber of Commerce in Mexico City, very widely attended by representatives of eastern and middle western houses, one westerner was present.

Mexico already ranks third among the nations of the world as a customer of the United States, only England and Canada purchasing more goods from this country, and further, at the present time ranks among those nations showing the most favorable credit situation. This is indicated not so much by increased volume of present trade as by extensive orders for the future along every line of demand. The same promising conditions are reported from Colombia and Peru. The entire west coast of the Americas, indeed, is reported in preferred financial position.

Better rail connections are needed to the south to close the ninety-mile gap at the northern terminus of the Southern Pacific Railway of Mexico, but it is expected that the improved stability of the country under the present administration will lead to the completion of the project. Western business men already enjoy good water connections with the south—and returned travelers urge on all sides that they cannot afford to wait longer to contest for their share of this attractive trade.

Business Effect of the New Tax Law

Provisions of National Tax Measure Agreed
Upon in Congressional Conference
Involve \$700,000,000 Saving

MUCH disappointment has been expressed in business circles over the new revenue act to reduce the surtax rates to a point where recipients of large incomes would be attracted to industrial investments instead of non-taxable securities. The bill, however, contains many constructive provisions. It is figured that some \$110,000,000 will be saved to American business annually through the reduction in corporation income tax. The bill greatly simplifies the collection of revenues and in its various provisions is of special importance to public utility corporations and other corporations which are earning small percentages on the capital invested. Among its provisions are:

A 12½ per cent corporation income tax.

No specific exemption of \$2,000 for corporations having net incomes in excess of \$25,000.

Corporations excluded from benefits of reduced rate on capital gains.

Capital-gain provisions allow complete deduction for capital loss.

Gains or losses in exchange of like kind ignored.

Dividends and interest not in excess of \$300 from local building and loan associations exempted.

It is estimated that the bill will relieve the country of more than \$700,000,000 in taxes during the two years which it covers.

Letters to the Editor

Geologist Discusses Relation of Damsites to Earthquake Faults

To the Editor:

Sir: At a recent meeting of the Commonwealth Club in San Francisco held to discuss the subject of earthquakes, mention was made of a proposed map of California which should show the location of the geologic faults that traverse our mountains and valleys. It was stated that such a map would be of material value to engineers, who might thus be informed regarding risks from earthquakes and might design dams or other structures accordingly.

It is well understood that the quake of 1906 would not have caused the disastrous fire if the water system of San Francisco had been properly located and designed to meet the effects of the earthquake, and it was demonstrated by the dams of the Spring Valley Water Company, which are

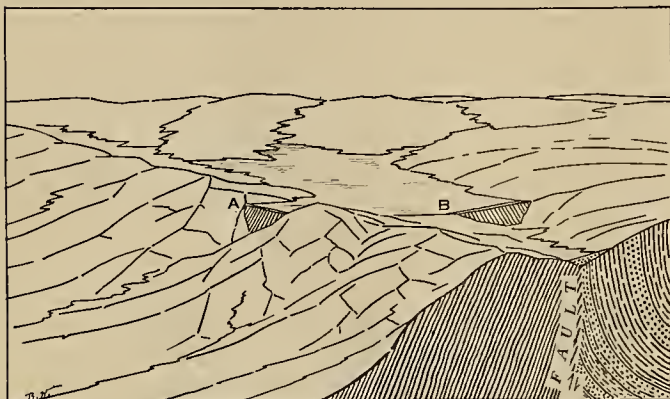


Diagram showing two types of damsites of common occurrence in California and their relation to a fault in the subterranean. The plane of the fault extends along the valley, under the reservoir, parallel with the ridge in the foreground.

built on the San Andreas fault, that good engineering can successfully insure such structures against failure. But if the engineering is to be good the engineer must be informed as to the movements that are likely to occur in the foundations.

Engineers, however, are as a rule not adequately trained in geology to recognize faults, and may without misgiving erect structures quite inappropriate to withstand the displacements which, from time to time, occur. If faults were few or if the stability of dams were a matter of little concern we would not need to discuss the question. But in California faults are very numerous and dams are basic structures for water supply and power. Their failure, furthermore, may occasion instant calamity.

I beg that you allow me to illustrate a pertinent condition, which is of rather common occurrence in the state, and in order that I may do so briefly I would ask permission to state without argument some possibly unfamiliar facts.

The first fact is that the rivers of California are as a rule older than the mountains through which they flow. Many brooks, it is true, have grown from the rivers up the mountain slope as gullies grow in a field, and they are younger, but the larger streams are generally older than the mountains.

This means of course that the comparatively young ranges have been pushed up while the rivers continued to flow. A swift-flowing river cuts a canyon, and it often hap-

pens that a canyon is cut deeper as fast as a ridge is raised higher. In that case the river maintains its course across the rising mountain block. A case in point is the passage of the Sacramento river through the Coast Ranges at Carquinez straits and the Golden Gate, these channels having been cut by the river before the bay region was submerged.

The accompanying illustration is designed to show a valley which is located upon a fault and the two kinds of damsites which may result from the development of the ridge and valley. It will be understood that ordinarily either dam would exclude the other. Thus the dam at A is located in the canyon cut where the master stream crosses the ridge. It runs parallel with the fault line and is liable to rupture only in case of violent movements such as characterize a great earthquake. The dam at B, on the other hand, crosses the fault line, and displacements occurring on the fault would pass through it transversely.

Examples of damsites having the general topographic relations illustrated at A or B will occur to any engineer familiar with the subject. The locations offer great advantages, a capacious reservoir, the confluence of streams, and a narrow outlet. But the fault which lies hidden beneath the alluvium of the valley constitutes a source of danger which may readily be overlooked. The engineer may possibly be excused for such an oversight on the ground that his experience in regions of less active mountain growth is with ridges and gorges whose development does not involve faulting. When streams sink their channels in a heterogeneous rock mass they carve away the softer and leave in relief the harder beds. The master streams, however, if they have sufficient fall and volume, may cut canyons across hard rock ridges upon which they become superimposed. The resulting conditions may then present a damsite topographically not unlike that figured at A, except that there is no fault beneath the adjacent valley.

The criteria by which the presence of a fault in the subterranean may be recognized pertain to geology. They are seen in the forms of the ridges and their slopes; in the arrangement and development of the rivers and their tributaries; and in the relative ages and attitudes of the rock masses. It requires a trained eye and an intimate knowledge of the local geology to recognize these evidences. It therefore seems desirable that engineers should be more generally informed regarding the possible or probable occurrences of faults, and it is to that end that the Seismological Society of America is planning to publish the Fault Map of California. Even though we must acknowledge that our knowledge is incomplete and that no general statement can take the place of direct examination in any particular case, yet the map will serve as a means of reference and may help to reduce the risks to the community from earthquake shocks.

BAILEY WILLIS.

President, Seismological Society of America.

Dayton Engineer Gives Personal Ideas on British Fuel Situation

To the Editor:

Sir: The liquid fuel situation in England is serious, as we all know, but rather than trust to reports, the writer has recently made a trip to that country to see personally how matters stood in this direction.

Since pre-war days there has apparently been a great falling off in the use of the automobile, due to the great increase in initial cost as well as the high cost of gasoline. This problem was so acute and the price (about 80 cents an imperial gallon) so high that a committee of investigation was recently appointed to report. About one-half the total

import of gasoline comes from the United States, rather more than 100 million imperial gallons per annum, and the findings of the committee were to the effect that the price of both the product in New York and the freight rates were higher than need be. Benzol, which was looked to as a substitute, is gradually being taken over by the oil companies themselves, and the price kept up.

My personal investigation of the fuel situation in England, leads me to the conclusion that the high original price paid in America may be due to the desire on the part of the British user to have only the cream of the gasoline. The majority of cars of British make will not burn the lower grade of fuel we get in the States and the people themselves do not appreciate how the fuel will have to be put on the market if adequate supplies are to be kept up.

A problem which has aroused great interest in England is that of the wholesale generation and distribution of electric power. It may be remembered that there has been an agitation for the generation of electricity wholesale at the coal mines. Sir Dugald Clerk, the leading authority on the internal combustion engine in England, has made a deep study of the problem of coal conservation during recent years. During my visit to England I had the pleasure of a long interview with him. Sir Dugald is a keen gas man; he is not in favor of the superelectric station for England, and in his opinion, from the coal conservation point of view, a gas service would be nearly twice as economical. He contends that the thermal efficiency for the generation of heat quantity by gas is over five times that of electricity. Under English conditions, the inverted incandescent gas lamp requires the use of 47 B.t.u.'s at the gas works, for each candlepower-hour obtained, while the one-watt electric lamp requires 54 B.t.u.'s and the half-watt lamp 31 B.t.u.'s at the generating station. High pressure incandescent gas burners mean 23 B.t.u.'s per candlepower-hour and flaming arcs 13.

He makes a comparison of the motive power for the two, but so far as the Pacific Coast is concerned, this is of little interest as the electric motor is pre-eminent. In England the efficiency of the gas engine is 1.6 times that of the electric motor on the basis of heat required at the generating station or the gas works. The real competition between the two systems is therefore confined to illumination. A visitor to London cannot fail to remark the very fine gas illumination in the public streets.

A controversy is raging on the subject of house warming. Here is a chance to show what electricity can do. It would scarcely be feasible to warm an English house by electricity, but at least the dampness could be reduced and local sun type radiators employed to keep chills away.

ROBERT W. A. BREWER.

The Engineers' Club, Dayton, O.

American Valuation Plan Urged as Solution of Present Tariff Problems

To the Editor:

Sir: Conditions of foreign exchange, especially in Germany, necessitate legislation to correct discrepancies in foreign prices, if American industry is to be afforded any adequate protection. To care for this condition, the American Valuation plan of assessing import duties is now before Congress. Under the depreciated currencies in many foreign countries, it is practically impossible to impose an ad valorem duty at a rate high enough to give the American manufacturer adequate protection against Germany, without making it prohibitive against other countries. If, on the other hand, we impose the duty upon the American wholesale value, all countries would be treated alike, regardless of their cost of production.

C. D. WAGENER.

American Valuation Association.

Radio Bulletins

The Journal of Electricity and Western Industry is sending out each week by radio-telephone a report on the outstanding engineering and industrial developments in the eleven western states, together with a concise review of business conditions in the principal cities in this district. The following excerpts are representative items taken from messages sent out.

At the request of a number of subscribers for this information, we wish to announce that 6XAC, the Los Altos station of the Colin B. Kennedy Company, which broadcasts the weekly news summary of the Journal of Electricity and Western Industry, operates with a wave length of 360 meters (as prescribed by Federal regulation) together with a 60-watt modulator and a 60-watt transmitter.

The Journal of Electricity and Western Industry wishes the many auditors who have been served by its weekly radio news and industrial reports success for the New Year. The eleven states of the West, especially those bordering on the Pacific Coast, are apparently entering a new era with the dawn of 1922. The events of the last few months portend rapid strides during the next twelve months.

Power companies during the coming year are planning to expend approximately \$100,000,000 in the development of electricity. A supply of power for the industrial growth of the state is definitely assured. If the growth in population in the various communities of the West during the past year can be taken as a criterion, the new year will bring thousands of people to the farms and the cities and many hundreds of thousands of dollars to be invested in business, agriculture and industry.

The past year has witnessed the growth of radio telephony from the field of the amateur to a commercial status and the new year will see a further development of its commercial possibilities.

A few of the outstanding engineering and news developments of the past two weeks follow:

From Montana comes the report that the Anaconda Copper Company and the American Brass Company, the largest producer and user respectively of the red metal, are planning to consolidate.

Herbert Fleishhacker, president of the Anglo, London Paris National Bank of San Francisco and president of the Great Western Power Company, has returned from Washington with a plan to rehabilitate shipping on the Pacific Coast by the formation of a thirty million dollar ship combine operating all ships of the U. S. Shipping Board.

A revival of the iron industry in the San Francisco bay region is presaged in the announcement that after January first all foundries will operate on the American plan with a ten per cent reduction in wages.

J. D. Ross, superintendent of lighting of Seattle, has announced that a radio telephone system connecting Seattle with the Skagit River hydroelectric developments of that city, has been installed.

Station 6XAC of the Colin B. Kennedy Co., which sends out the news reports of the Journal of Electricity and Western Industry, has been heard in Washington, D. C., as the result of tests which were held recently.

A general review of business conditions throughout the West shows a definite tone of optimism despite the falling off of the holiday trade. Many retail lines have announced price reductions while stores are holding pre-inventory sales. Reduction of freight rates in many lines, including electrical apparatus, have been announced by the railroads. The past storms, while doing some damage, assure a definite water supply for irrigation and power during the next year. Industry is still quiet but there are rumors that plans are ready for increased activity in almost every line. Reorganization has been effected, plants overhauled, and markets studied during the period of quiet in preparation for a renewal of manufacturing activities.

Builders of the West

JAMES G. McDONALD, president of the McDonald Chocolate Company of Salt Lake City, was never shipwrecked on a tropical island. If, however, that had happened, had you gazed about the island a week or so after the gentleman was washed ashore, you would probably find that very quickly he had set up a sort of chocolate factory. He had found cocoa beans on the native trees which he beat into a powder. He had discovered canes that yield sugar. The combination of the two and the addition of some fruits yielded by the trees and bushes furnished a confection the like of which the shiny natives of the island had never tasted before. We would also find that he had banded the natives together who had selected leaders and made a collection of their finest native handiwork and the products of the island and staged an exposition to which the neighboring tribes were invited. Now all this is purely fanciful—but it is probably what would happen if fate should put this man in some strange part of the world some day. It's just about what he would do, because it is just what he has been doing for the greater part of his life.

Pioneering comes naturally to James G. McDonald since his parents were pioneers. The prospect of a trip on foot from the Missouri river to Salt Lake City did not hinder them from coming across the plains in the early days to make a fresh start in what had been pictured to them as a land of promise. It was a land of promise—for those who made it so, but it paid no dividends to the shirker.

Mr. McDonald received his early business training in a store conducted by his father and had small opportunity for schooling, as schools were not then what they are today in quality or number, but his education has been well rounded and intensely practical.

In his youth he determined to be a manufacturer and selected candy-making as his life work. From a little factory in the rear of his father's grocery store, his plant grew in a few years so that other buildings in the same block had to be leased. One used to enter the McDonald factory offices through an alley some five feet wide leading off Main street. Today it is one of the



JAMES G. McDONALD

President of the McDonald Chocolate Company of Salt Lake City, who is one of the leaders in business and community development of the Intermountain region.

business and afield, a man who has not been too busy to acquire a deeply religious and spiritual character, nor to carry into practice his moral and spiritual convictions. Nor has this man been so engrossed with his own success that he has been unwilling to put his shoulder to the wheel for the common good. As a director and for many years president of the Utah State Fair Board, Mr. McDonald was a powerful figure in promoting the interests of home industry in Utah in its every branch. Under his administration the Utah State Fair has developed from a very small annual display of agricultural and manufactured products into one of the West's most important expositions. Mr. McDonald has been and is identified with some of the largest institutions of Utah in addition to being the head of his own establishment. He puts the same energy into all of these that he displays as the leader of his own organization.

To James G. McDonald, then, for his application to the upbuilding of the community the same unselfish pioneering spirit which has distinguished his business career, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

West's big institutions. The McDonald factory pioneered in many ways—an elaborate roof garden for the pleasure of its employes was one of these ventures. In those days sociology or welfare work was an untried experiment. There were plenty of Salt Lake businessmen who honestly wondered "what Jim McDonald is driving at now." In this roof garden—from which, by the way, the famous Roof Garden chocolates derive their name—there is a cafeteria, dance hall, player piano, phonograph, and aviary with the familiar McDonald parrot a scheduled featured specimen.

The goods he and his fellow-workmen made during his early days as a manufacturer were sold by McDonald himself. Mounted on a horse, with a small sample case strapped to his saddle, he rode about the sparsely settled Utah of those days and sold his wares. It would be hard to find a man who can tell a room full of young salesmen more about the psychology of salesmanship. Mr. McDonald is a many-sided man—a sportsman in

Business Research — Its Necessity, Methods and Results

How the Business Depression of the Past Year has Demonstrated to the Business Man that Business Research Lies at the Base of Scientific Production and Distribution

By E. H. TUCKER

Economic Statistician, First National Bank of Los Angeles

BUSINESS depression has served to emphasize and bring into clear relief the evolutionary forces which are dominating business in the United States. The Nineteenth Century was the century of the pioneer, a period of lavish returns or of heavy losses. The successful development of a new country, new industry or a new business brought with it such returns that it was unnecessary to bother about wastes or petty economies. With the turn to the Twentieth Century the pioneer period had almost disappeared. The transcontinental railroad lines were laid, most of the agricultural country was either developed or in the process of development, and the lines of industrial development were more or less established. It is true that there is still much pioneer work being done in the West, but even this pioneering bears the stamp of the new era of business life.

The period of scientific business is superseding the period of pioneering. The business depression through which the United States has been recently passing has emphasized this change, through pointing out the need for scientific business knowledge as a basis for successful business programs. It has taught the cattle raiser of the Inter-mountain region that his price for cattle on the hoof must be affected by the ability of the citizens of Europe to purchase American-made shoes. The producer of power is coming to a definite knowledge that the consumption of power in the West is closely related to the absorptive powers of the Oriental markets. Large pioneering returns are giving way to small scientifically calculated margins of profits. What was formerly wasted has now come to be the margin between dividends and bankruptcy courts.

It is factors such as these that have brought business research to the forefront as a vital factor in business throughout the United States. The more scientific business becomes the more essential becomes the need for scientific data as a basis for business policies. It is the duty of the research organization to furnish this material.

Two Primary Channels of Research

The modern business man is primarily interested in two factors—the materials which he uses and the markets for the goods which he sells. In the manufacturing industry his interests lie in supplies of raw materials and in wholesale markets. In wholesaling his interests lie in supplies of manufactured goods and in the absorptive powers of retail markets. In retailing his interests lie in supplies of finished goods and trends of consumption and of consumptive markets. For this reason business research tends to run in two primary channels, serving

the two main interests of the business man, be he producer of raw materials, manufacturer, jobber or retailer.

The first channel is that of tracing the supplies of raw materials and the second that of gaging absorptive powers of markets. With research organizations furnishing this knowledge, the business executive is in a position to determine policies, to outline the amounts of raw materials to be purchased, the period when they will be purchased, and their price trends. He is also in a position to estimate the amount of production which he can profitably market and the markets in which his goods can be sold. In other words, business research lies at the base of scientific production and distribution of goods.

The type of research material required by each individual business concern will, of course, vary with the particular phases of business activity in which that particular organization is interested. It is consequently impossible to lay down a general rule as to the types and sources of material to be gathered by all producers or distributors. Those concerns which are sufficiently large to absorb the overhead are establishing their own research departments, which are in a sense still pioneers in this new field and are establishing their own contacts and their own sources of information. Other businesses, not in a position to make the original investment or not sufficiently large to permit the savings resulting from such a department to offset the overhead of research organizations, must rely upon such data as is readily and conveniently available at comparatively small cost.

Three Types of Material Used

The research material used by the modern business research organization is of three important types. The first of these is the data already compiled, in available form, and capable of being used and interpreted with comparatively small effort. The second of these is that data which is already maintained but which has not been gathered together, correlated and compiled so as to be available for immediate use. The securing of this material required the expenditure of considerable time on the part of the research staff. The third, and probably the most difficult type of information to secure, is that which is necessary but which has never been prepared. To secure this data, original studies and investigations must be inaugurated, and staffs of trained specialists must be employed.

The procedure followed in building a research organization and the particular material gathered will, of course, vary with each business house and

will be dependent more or less upon the products handled and the general policies of the concern. The businesses which are in a position to maintain their own research organizations are, as a general rule, so large that their interests are more or less nation or world-wide and they consequently find it essential to use all available material with regard to world or national conditions in their own particular industry. The smaller organizations are apt to be dependent upon some particular research organization serving a large business or a large group of businesses, and must supplement the general data which they secure from such an organization with their own particular information with regard to their own businesses and their own localities.

Research Idea Will Grow

The supplies of business information are not so plentiful today as they will be in the future, for the trend of modern business toward more scientific business knowledge is just making itself felt and as this trend becomes more pronounced increasing amounts of accurate business information will be maintained in such form as to be available for interested parties. However, there is such a large mass of material already available that in many cases the mere compilation of this information will be sufficient to take care of the immediate research needs of business organizations. The United States Government and the various states are constantly preparing very important statistical data with regard to the trend of production in agriculture, mining, and industry and from time to time reports are available which deal with productive tendencies and are often compiled in such a manner as to show business trends in even such small political sub-divisions as counties and cities. Business is showing an ever-increasing tendency to exchange information and to maintain research organizations for compiling statistical material with regard to particular industries. Such information as that maintained by the National Association of Lumbermen and the American Petroleum Institute is of vital importance to those interested in the trend of production and sales in connection with these particular commodities. The information maintained by such research organizations within particular businesses is becoming increasingly important in American business. There is every indication that this new departure in American business life will continue to expand, and, as files of important statistical material are accumulated, perform increasingly valuable services.

Services of Bank Research Department

Probably one of the most important phases of the modern tendency for the gathering and compilation of business facts, is the inauguration of research departments in the banks of America. The banks of the country have been likened to the hub of the wheel of economic progress. They finance every business and every industry, and are vitally interested in the trend of production and consumption within industries which they are financing or are asked to finance. This requires an accurate knowledge of such things as the productivity of the

locality in which they are located, of markets for the goods produced, of all possibilities for and practicability of new types of productive enterprises, and of prices and price trends.

It is absolutely essential that a bank in granting credit to a business man be thoroughly acquainted with the trend in that man's business and this information can be secured only through a research organization which is sufficiently broad in scope to have knowledge as to the general trend of business conditions and which is yet sufficiently specialized to have equally important knowledge with regard to the various important businesses in the district in which the bank is operating. Consequently the bank research department is becoming increasingly important to the business organizations which are not in a position to maintain their own highly trained and specialized research men, by furnishing them with reliable information.

Once the type of information desired and the sources of it have been determined, the research department cannot attempt to function as a vital factor in business management until the methods of presenting the data gathered have been definitely determined. When a business maintains its own research organization it must, of course, determine upon methods of presentation which will be the most readily understood and the most beneficial within that particular organization.

Forms of Presentation

As a general proposition, however, statistical material is presented in one of three forms: either by chart, by table, or by straight reading material. Often the three methods are combined and each method has its own particular advantage for particular data and for certain types of business men. Upon the whole the chart method, properly interpreted by statements accompanying the chart, is gaining in favor, because of its readability. Ordinarily the chart is capable of showing a trend or a tendency and making the point desired much more easily than mere tables or ordinary reading matter.

This material when properly compiled is, of course, of comparatively small importance unless it can be properly applied and the application must come in the executive offices of the particular business desiring to use the information. Once an organization has gathered together data with regard to the trend of productivity, the trend of prices and the trend of markets, in addition to its better knowledge of external factors affecting production and distribution, it has acquired a means of checking its own internal progress. It may parallel this external data with similar data with regard to its own particular organization and thereby show clearly wherein the business is keeping pace with, going ahead of, or falling behind the general trend in the industry. From this information the executives may draw reliable conclusions as to the places where the concern is strongest and weakest and as to the policies which must be followed in continuing production or distribution of goods.

Difficulties of Transportation to Mountain Power Projects

Kerckhoff Development of San Joaquin Light and Power Corporation Finished in Record Time by Ingenuity and Daring of Engineers in Handling and Forwarding Materials

By REX C. STARR

Construction Engineer, San Joaquin Light and Power Corporation

THE location of hydroelectric projects is a matter that is predetermined by the elements entering into the development, and the ways and means to reach the combination of elements making the development possible often test the ingenuity of man. Many ideal power sites remain undeveloped because of locations considered inaccessible. Any information on transportation problems may hasten the development of many of these inaccessible power sites.

The following account of the transportation problems incidental to the construction of the Kerckhoff project of the San Joaquin Light and Power Corporation, should give some idea of the achievement accomplished and methods used. The Kerckhoff development is located on the San Joaquin river, 45 miles northeast of Fresno and four miles from the nearest railroad point at Auberry, where the San Joaquin & Eastern Railway has terminal facilities.

The first party of construction engineers to move in on the job, May 10, 1919, found only wilderness between Auberry and the damsite. Without so much as running a line to determine the levels, teams were put to work on a road over the mountains, plowing and grading behind pioneers, who cut away the timber and blasted the rock. Sixty days' feverish work brought the road to the canyon side, where a clearing was made for a supply dump and hoist house. A power line run parallel to the road and tapped at points, furnished power to operate a portable air compressor, which was used in drilling rock for blasting. The road winds around mountains and skirts ravines, ending on the brink of the San Joaquin River Canyon 1100 ft. above the river bed and one-half mile from the big construction work.

The road completed, the next job was to get materials and men down the 1100 ft. to the dam-

site. The plans called for a 3700-ft. incline cable tram, the construction of which would require several weeks' time. Speed was required, and time was limited, so it was decided to begin operations at once on the foundation while the construction of the incline cableway was in progress. Both skill and daring were required in the work of transporting materials down a mountain side having grades of 100 per cent, yet this feat stands out as a prominent factor that made possible the completion of the Kerckhoff dam in seven months' time.

Diamond drills, air compressors, and camp supplies for 100 men were lowered by means of sleds built up of lumber that was later used in construction work. These sleds were drawn by mules and snubbed from the rear by lines hitched to trees along the pathway. Timbers for a bridge 300 ft. in length and 65 ft. high, and compressor units weighing 14,000 lb., were let down the canyon sides in this way.

With the opening of over four miles of mountain road and the installation of the tramway and hoist, the movement of materials began in earnest. While the road was passable, it was far from completed and required a large crew of men to get it into shape for the heavy trucks carrying cement, lumber and machinery. The material for the dam was hauled with three 5-ton and seven 2-ton trucks which cut the roadway into deep ruts that were smoothed out as quickly as it was possible to work men and road machinery between trips and at night. Water for the sprinkling and also to supply the main camp at Auberry was pumped from the San Joaquin river through a line laid along the road. Two trucks equipped with sprinklers operated at night. Materials were delivered at the end of the road to the head of the incline, where plat-



Down this rough and steep trail materials and men were transported that saved more than one month's time in the preliminary work of building the tunnel and dam of the Kerckhoff project of the San Joaquin Light & Power Corporation. An incline railway was later installed at this point.

forms were built for storage, to obviate waiting for the incline cars.

Cableways Across Canyon

As material was delivered to the foot of the incline, it was placed at points where needed on the dam by means of two cableways anchored across the canyon, each having a capacity of ten tons, so arranged that a complete load on the incline car could be picked up and delivered to any part of the



Six transformer tanks being hauled in one train of six trailers by the Holt Caterpillar. The heaviest units were hauled in by this tractor, at the cost of about sixteen cents per ton mile.

work. The work of loading the trucks at Auberry was handled by cranes placed conveniently near sidings and storage platforms. The materials were forwarded as rapidly as the construction crews could handle them, and no opportunity was lost to load direct from the car to trucks.

An additional nine miles of road was constructed to points of approach for tunnel adits and to reach the power house camp. These roads were of the same character as required for the dam construction with the advantage of a down-grade haul for 90 per cent of the distance. The maximum up-grade to the power house camp is 6 per cent, while the maximum down-grade is 12 per cent. The road to the power house was kept in condition by sprinkling and dragging with a curved edge drag to give a slight crown to the road.

Road to Power House

The power house is located in a box canyon, and 400 ft. below the only available space which could be used for storage. It was, therefore, necessary to install an incline railway for transportation from storage yard to power house site. This incline is 1000 ft. long and has a maximum grade of 100 per cent as it enters the building. A $\frac{7}{8}$ -in. cable is used and hoist equipped with 150-hp. slip-ring induction motor. A 15-ton derrick was installed between the track and road for transferring material and equipment from trucks and trailers to the incline cars.

The heaviest units entering into the development were taken over this power house road by means of a 75-hp. Holt Caterpillar, drawing a 30-ton four-wheel trailer. The road stood up well under heavy loads of 29 tons. Lighter loads were handled by trucks and by means of 10-ton trailers. Addi-

tional transportation equipment was placed on the work as required until the peak of the load required the following: one 75-hp. Holt Caterpillar, one 45-hp. Holt Caterpillar, one 30-ton trailer, six 10-ton trailers, two 15-ton horse-drawn wagons, four 5-ton two-wheel trailers, three 5-ton Mack trucks, one 5-ton Pierce Arrow truck, one 5-ton White truck, one 2-ton Mack truck, four 2-ton White trucks, two Dodge commercial cars, and nine light service cars.

Cement was the most important material to be transported because of the constant need for it, and the great aggregate weight of the material required. Lumber was a close second in tonnage hauled, averaging four pounds to the board foot because of the large content of moisture in the green lumber, most of which came direct from the sawmills.

A summary of the total tonnage hauled for the Kerckhoff development, exclusive of transportation of men and work of light service cars, shows the following:

Cement, 161,623 sacks	8,081 tons
Rail	646 tons
Lumber, 3,818,200 ft.	7,636 tons
Explosives, 1,280,300 lb.	640 tons
Equipment and supplies, 9,911,902 lb.	4,956 tons
Power house equipment	329 tons
Penstock	709 tons
Subsistence	1,622 tons
Salvage haul of equipment, rails, pipe, lumber and supplies.....	3,196 tons
	<hr/> 27,815 tons

The heaviest pieces hauled were the generator rotors, weighing 29 tons each. These were transferred from the car to the 30-ton trailer and hauled by the 75-hp. Holt Caterpillar to the power house, requiring a half-day's time for each piece. Cement was also hauled on 10-ton trailers loading three in



Section of penstock being hauled to head of incline on Kerckhoff development. The cost of trucking averaged thirty-one to thirty-five cents per ton mile. On account of the necessity for speed, trucks were used wherever possible.

a train behind the 75-hp. Holt. At one time six transformer tanks were hauled in one train of six trailers. During the rush hours of completing the big job, one thousand tons of material were hauled in seven days from Auberry to the power house.

The cost per ton mile for hauling with trucks was 31c. to 35c., as against about 16c. by tractor. The element of speed, however, made necessary the more rapid truck transportation wherever possible.

Changes in the Mechanism of Distribution Now Under Way

A Survey of the Present Distributive System and a Discussion of How It Has Been Affected by Conditions Arising from the Pressure of Increased Commodity Prices

By E. A. KINCAID

Instructor in Economics, University of California

FROM the beginning of what may be called the Rooseveltian period up to the present time our institutions of all sorts have been subjected to much criticism. Both economic and political institutions have come in for a large measure of critical discussion and among the former institutions none has received less of constructive criticism than the marketing system. Much of what has been said about the marketing system is not worthy of serious consideration since it has been nothing more than fault finding without the support of reliable data for such charges as have been definitely stated.

The whole of the period under consideration has been marked with the pressure of rising prices. There has resulted from this an increased burden on our economic institutions which is the immediate result of an effort to make them perform the old service more economically and thus in some measure to offset rising prices. Our economic institutions have not responded freely to the changed conditions and this is particularly true of the distributive system. Consumers have sought to preserve their standards of living in the face of rising prices. With every reduction in the standard of living there has come a renewed attack upon the distributive system. Dissatisfaction has not been confined to the consumers. Producers, including both manufacturers and agriculturalists, have had much to say against our marketing system. They assert that they have not been able to get efficient access to markets and the distributive system has been maligned from both sides.

Attitude of the Farmers

It has never been difficult to arouse the opposition of the farmer against the marketing mechanism of the country, largely because farmers as a class have very little contact with the system. They deliver their products to country stores, to local buyers and to car-lot shippers and their knowledge of the process of distribution stops there. Farmers have been influenced by the discussion about the thirty-five cent dollar which many critics of the marketing system have dwelt upon. It is true that the final allocation of the several portions of the consumer's dollar sometimes leaves the farmer but thirty-five cents, but it is also true that for many products the farmer receives much more. While the process of prorating the consumer's dollar has been hastily stated on the basis of thirty-five cents for the farmer and sixty-five cents for the middleman, and this relationship has been applied to all products indiscriminately, the fact remains that talk of this character has been altogether too free, particularly so because it is not possible to show that the farmer, on the average, receives but thirty-five cents of the consum-

er's dollar. In fact it is not possible to show with accuracy just what portion of the consumer's dollar does go to the farmer, for there is a great absence of data upon which to base a statement.

Quite regardless of this fact, farmers have generally accepted the criticisms of the marketing system as just. They have been influenced to adopt this attitude by the course of recent events. Since May, 1920, prices have been declining except for the very recent check in the movement. In the process of readjustment which changed economic conditions have compelled, the prices of farm products have shown the most ready response. They are nearer to the pre-war level than the prices of most of the products which the farmer has to buy. This maladjustment has meant a high cost of living for the farmer, means of escape from which are not yet apparent. Buying high-priced clothing and building materials with low-priced wheat and cotton is certain to produce a critical and questioning attitude on the part of the farmer.

Much of the explanation for the maladjustment of prices is believed to be found in the marketing system. At any rate the members of Congress who have formed the "agricultural bloc" have apparently accepted this point of view. Under the pressure exerted from their constituents members of Congress from the great agricultural states have formed a bi-partisan organization which has functioned most effectively up to the present time.

The efforts of the farmers to get at the marketing system has not ended with legislation. The co-operative movement has been given a great stimulus. Farmers have been urged to adopt cooperation as the solution of the marketing problem. Cooperation, when properly organized and efficiently managed, can be made to render excellent service to growers, but it is not a cure-all and it is certainly not an automatic remedy. It works well only when given much highly trained administration and where growers have learned to stand back of their organizations.

Attitude of the Manufacturer

The dissatisfaction of the manufacturer with the marketing system has taken quite a different form. He has shown a disposition to go around or over the head of the middleman. Many industries have reached a high state of efficiency with the aid of the expert marketing facilities of middlemen, only to abandon them. Such is the nature of the charge against Proctor & Gamble as the result of their decision to extend the same quantity discounts to retailers that were formerly extended to wholesalers alone. This move was looked upon as a powerful attack upon the jobber, the key-stone in the orthodox

system of distribution. The ability of the manufacturer to go around wholesale middlemen or to dictate terms in event his services are used, is the result of nation-wide advertising campaigns on the part of the manufacturer. He has expended vast sums in building up a demand for his products and he does not like to see the jobber substitute his trade-marked lines for those so effectively advertised. Selling direct to the retailer is one way around this difficulty.

The disposition of manufacturers to go around the jobber may well be described as a tendency. Some manufacturers have tried it and then returned to the jobber form of distribution, but there is still a tendency to experiment with a system of distribution which is independent of the jobber. For this situation jobbers are largely to blame. They have placed their own trade-marked lines directly in competition with those of manufacturers and the latter has come to feel that the jobber's lines are pushed and his own are held back. The jobber has replied that he has been forced to this method of business because manufacturers have gone into the jobbing business. The manufacturer demands efficient distribution of products which he has highly advertised. He cannot leave his access to markets entirely in the hands of the jobber who shows no disposition to confine himself to his proper field. Thus the argument runs back and forth and meanwhile there is a good deal of chaos in the distributive mechanism. So much, in fact, that one hesitates to use the word system as truly descriptive of it. Some very well informed jobbers have suggested that the way out of this difficulty is to be found in strict adherence by the jobber to his true economic function. It is certainly true that no more efficient system of distribution exists than that through the jobber where he confines himself strictly to the jobbing business.

The position of the middleman has been endangered by the invasion of the field of distribution by the great meat packing industry. These great industrial organizations have perfected a system of distribution for their immediate products, but they have not stopped there. The very existence of an efficient distributive organization for meat and meat products has made it desirable for the packers to handle certain closely related lines. This tendency to expand much aroused the fears of the wholesale grocers and they succeeded in having it checked by what was known as the Packer Consent Decree. Recently there has been an effort to have the Decree relaxed somewhat so that the Packers might expand their field of operations and hearings are now in progress before an inter-departmental commission at Washington to bring out the facts. Independent middlemen feel that the low cost per unit which the Packer distribution will involve will be sufficient to drive them out of business and thus to still further modify the present system of distribution.

The distributive system has been seriously affected by the growth of chain stores, department stores and mail order houses. Fear of the last two has largely subsided though it cannot be said that they are regarded with favor by jobbers and retailers

of the old line. The chain store, however, is a new and growing menace the possibilities of which are not yet fully known. While the chain store movement has shown a tendency to over-expansion, it possesses inherent economic advantages which are likely to make it permanent. Thus the old-time distributive system has been permanently modified in another direction.

Open-price Associations

The marketing system has been menaced by other factors and some of these may be summarized under the phrase "unfair competition." The devices to restrain or temper competition have been numerous and varied. The most recent one to be tried is known as the open-price association. It has been said that open-price associations ramify the whole business system of the country and that they are responsible for high prices. Whether or not this charge is true the fact remains that the mere existence of such organizations has caused the middleman to be looked upon with suspicion. It has been said on high authority that the open-price association has been the chief cause of the wide divergence of retail and wholesale prices. A distributive system that is under attack from several sides and that is obviously undergoing serious modification cannot afford to be regarded with suspicion. It is, therefore, fortunate that the Supreme Court recently found the open-price association in violation of the Sherman Law. The court took the stand that the associations made competition ineffective and it must follow that the court very properly reached its decision if the charge is correct. Competition is the very essence of our economic system. Business men of vision must surely recognize that the alternative to competitive fixing of price is either monopoly or government regulated by commission. Where monopoly exists commission regulation tends to come about and that was just the reason why the farmers demanded legislation regulative of the Packers. Regulation by commission is government invasion of the field of business. It is fraught with great consequences for the failure of regulation leads on to government ownership or operation or both. Thus we arrive at state socialism. Hence the statement that business men of vision will not encourage organizations which are formed for the purpose of restricting competition. The decision of the Supreme Court concerning the open-price association must therefore be welcomed since it was generally held to be a device for restricting competition.

A survey of the present distributive mechanism must take account of all the various subjects which have here been considered as well as others which cannot be discussed in this article. Enough has been said to indicate that far-reaching changes in the mechanism of distribution are under way. Just what they will come to cannot now be said. It is likely that the old type of distribution from producer to jobber to retailer to consumer will be materially modified but it is improbable that it will be entirely done away with. It has inherent virtues which, if realized, should preserve it.

Use of Artificial Daylighting in Industry and Commerce

The Demands for and the Requirements of Artificial Daylight in Industrial Processes and in Stores, Especially where Accurate Color Matching is Required are Many and Varied

By G. H. STICKNEY
Edison Lamp Works

THOUGH much has recently been said and written about the use of artificial daylight in commercial and industrial fields, there are still many people today who are unacquainted with the features of lighting which make for especial accuracy in industrial processes. Often the fundamental requirements in artificial lighting for accurate color matching and color discrimination are unknown. Even when the fundamentals are known we often find either that equipment in use is inadequate or that proper equipment is wrongly applied. With a view to clearing up some of the misunderstanding which now exists, a general review of the subject will not be out of place. For most purposes light emitted from ordinary incandescent lamps is of a color which is artistically pleasing and suitable. However, in certain instances it is most important that colored materials be manufactured, inspected, and sold under a light more closely approximating daylight in color than that produced by ordinary lamps.

Daylight is complex and varies widely in color and intensity because of the different degrees to which the earth's atmosphere modifies it. Water, clouds, dust, and vapor in the atmosphere; the color of reflecting surfaces; the position of the sun; and many other contributing factors give us a combination of direct filtered sunlight and skylight and cause considerable variation in the character of daylight. Light from the north sky, from which direct sunlight is always absent, has invariably been preferred for accurate color matching because it is subject to less variation than other natural light. Arti-

ficial lighting of even a more accurate color standard than north skylight can be and has been produced, but as it is expensive, it is impractical except where the areas to be lighted are small or where the demand for accuracy is great.

Commercial Uses

With few exceptions, greater care is taken to maintain high standards of accuracy in the industrial field than in the commercial field. The location and interior furnishings of the establishment in which goods are sold generally so affect and modify the daylight which penetrates an interior, that accuracy in color matching is impossible. Indeed, the very fact that but few attempts have been made to remedy this condition shows that store managers do not appreciate to the same degree as manufacturers, the value and importance of this feature. In general, demands for efficient light greatly surpass demands for highly accurate light in commercial and industrial interiors.

By passing light from an illuminant through a glass so colored as to absorb part of the radiations which are in excess, it is possible to produce approximately the same balance of light rays as exist in daylight. The ever increasing demand for light of a more efficient degree of color modification than that produced by ordinary incandescent lamps led to the development of the Daylight Mazda Lamp. This lamp is constructed in a scientifically determined bulb of special blue glass which cuts out some of the red and yellow rays of ordinary incandescent light and produces a light which is a fairly close approximation of daylight. In spite of the distinct advertising

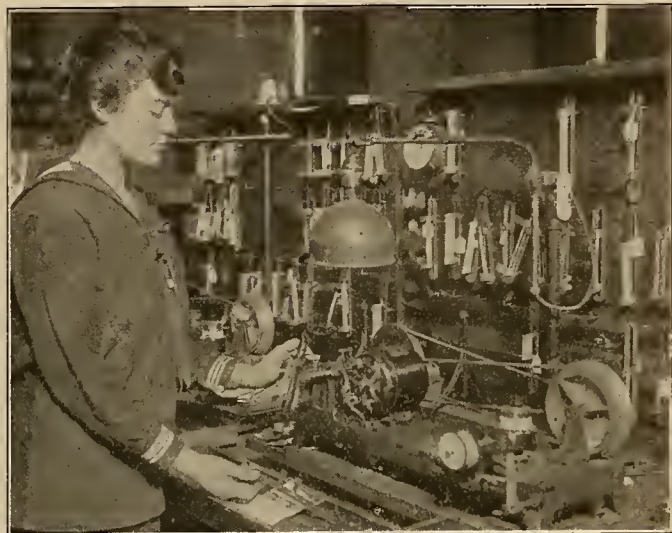


Simulating daylight conditions by means of artificial daylighting in the millinery department of Livingston Bros. department store facilitates rapid selection of merchandise. There is no waste of time in endeavoring to explain what a color is like, the most delicate shades being distinguishable.



Many stores today are using accurate color matching units of the counter and suspension type in conjunction with lamps for general lighting. These do away with the inconvenience which formerly existed when the customer had to carry his purchase to a door or window to verify its exact colors.

value of artificial daylight in the modern store, it is doubtful whether Daylight Mazda lamps will ever supplant regular Mazda "C" lamps for general store lighting. As mentioned before, goods designed and intended for use under average night illumination should naturally be displayed under light from ordinary Mazda "C" lamps. Consequently, the only departments really requiring general lighting that ap-



The daylight quality of artificial light makes possible the quick perception of fine filament wire and the rapid and accurate setting of filament forms in the marking and forming department of the Oakland, California, Mazda Lamp factory of the General Electric Company.

proaches daylight are those that handle clothing, materials and articles to be worn or used out-of-doors. A show window equipped with Daylight Mazda lamps stands out prominently because of the marked contrast between the white light emitted from these lamps and the surrounding yellowish light. Further, window displays of men's clothing, furs, or hats, are shown best under light from these lamps. Though not universally applicable, the Daylight Mazda is entirely suited for window lighting in certain instances.

Industrial Uses

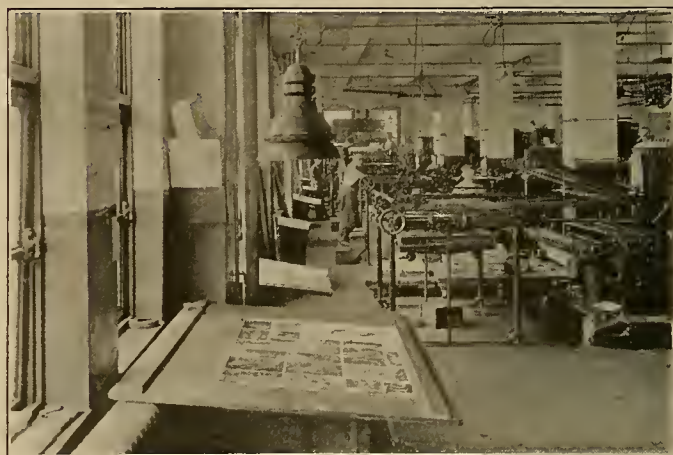
The uses for artificial daylight in industry are wide and varied, but not difficult to detect. It is an interesting fact that greater speed and accuracy invariably result in the manufacture and grading of colored goods when light of daylight quality is provided. Many textile mills have installed Daylight Mazda lamps over looms, in order to insure the use of thread of the correct color in the shuttles, as well as in the warp. In laundries, light from these lamps enables operators on the folding and inspection tables to detect spots that, under the yellowish light from clear lamps, tend to merge into a white background. Daylight lamps have proved valuable in mines in the West in grading ores, difficult to separate because of similarity in color. In the testing laboratories of chemical manufacturers, Daylight Mazda lamps have given satisfactory service. They have been of great use in sugar refineries, for grading different refined sugars. Some manufacturers of photographic supplies find the light from Daylight Mazda lamps useful for examining the color and quality of prints. In

printing plants, where it is essential that colors be shown in their correct relation, Daylight Mazda lamps have been used.

In addition to the industries mentioned, modified light has proved a great help in cigar factories, where cigars are graded according to shade; in oil refineries, where the different grades of oil are determined; in jewelry establishments, where pearls, diamonds and other precious stones are critically examined, and in miscellaneous places about flour mills, button factories, potteries, and paint factories.

The few examples given indicate the broad general fields for the application of artificial daylight. Needless to say, there are thousands of instances where the accurate type of color identification unit is of distinct service. Small areas lighted to a high intensity give a means of insuring uniform quality of product either by constant or periodical inspection. In this field might be mentioned dye manufacturers, cotton brokers, silk, cotton and woolen mills, ribbon factories, bleacheries, lithographing plants, dental supply factories, chemical works, jewelry factories, button, paint, paper and other industrial plants too numerous to mention.

A growing use for artificial daylight touching everyone is in the home. It is true that the somewhat cold light produced by Daylight Mazda lamps does not recommend it to the average individual for general artistic effects. In the kitchen, however, light of this quality is of distinct assistance in preparing sanitary food and has been widely applied.



A Macbeth Color Identification lamp over an examining table in the color press room of a commercial printing establishment, where accurate matching and comparison of colors is absolutely essential. Increased production, reduced color troubles, elimination of eye difficulties, and elimination of hurry during daylight hours is the result.

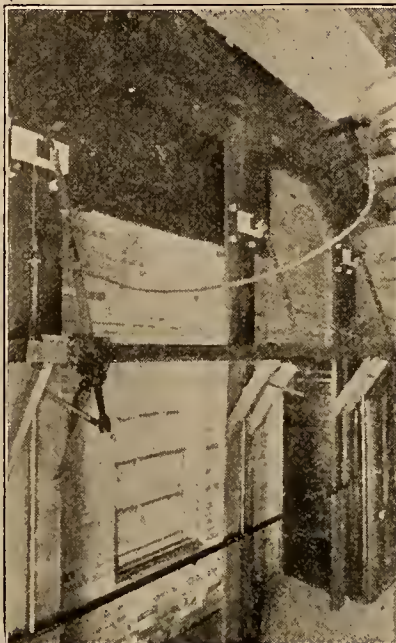
An excellent portable lamp for the living room is so designed as to completely hide the light source from view and to emit a majority of the light at an angle producing a maximum illumination on vertical surfaces. This is equipped with an accurate type of color modifying plate. The quality of illumination thus produced is remarkably pleasing for reading and sewing. Observation has convinced the writer that, as a reading lamp, such a unit has very marked advantages and surprisingly little eye fatigue results with long periods of close application.

World Records of the West—From 10,000-v. to 220,000-v.

One of a Pictorial Series Featuring Interesting Applications of Electric Service, Advances in Home, Industrial and Power Construction and Noteworthy Developments in Western Progress



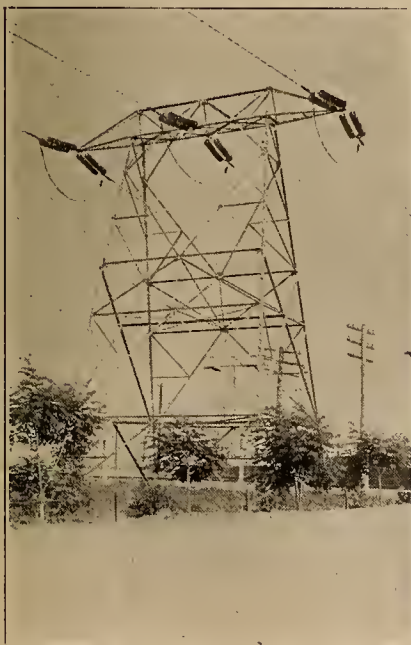
Previous to the erection of the Pomona line in 1891, sending 10,000 volts a distance of 20 miles, it was thought that electricity could be used only within a small radius of the spot where it was generated. This California experiment ranks as the first record.



High tension switches on the 40,000-v. Provo-Mercur line of Utah, which for many years ranked as the world's highest voltage. In 1896 a noted scientist wrote an article for this paper prophesying 60,000-v. as the physical limit of high voltage transmission.



The upper limit of high voltage was again broken a few years later when the 70,000-v. Colgate line was brought 200 miles into San Francisco by the Bay Counties Power Company. Another record was established by this line in the long span of Carquinez Crossing.



Until 1921, the 150,000-v. Big Creek line of the Southern California Edison Company held the record for high voltage transmission. This is the highest actual operating voltage at the present time, other lines of higher voltage being now under construction.



The 165,000-v. line of the Great Western Power Company from the Caribou plant is now operating at 15,000 v., but is soon to carry the higher voltage for which it was designed. For a short time it will hold the world's record in transmission achievement.



Since the early experiment of 1891, long-distance transmission of power has revolutionized western industry and agriculture. The newest record is the 220,000-v. Pacific Gas and Electric Pit River line which is to be put into operation during this summer.

SOME WESTERN HYDROELECTRIC PROJECTS UNDER

Prepared by the Journal of Electricity and Western Industry in

Company	Name of Plant	Location	Dam and Reservoir	Tunnels	Maker of Water Wheels	Penstocks
Bridge River Power Co.	Bridge River Plant	120 mi. from Vancouver, B. C.	Simple concrete arch 157' high. Capacity 1,250,000 acre-ft.	Two 12,800' long, 12½x14' concrete lined, 1,500 sec.-ft. flow	Not awarded	Eight, dividing into 16 at Power house 78" to 50" dias.
British Columbia Electric Railway Company	Fourth Unit Stave Lake Plant	40 mi. E. of Vancouver, B. C.			Escher Wyss Co.	One riveted steel line, 14½' dia., 170' long.
City of Seattle	Newhalem Plant	100 mi. N. E. of Seattle, Wash.	Small diversion dam on Newhalem Creek	Length 2,675' under 266' pressure at lower end	Pelton Water Wheel Co.	One electrically-welded line, 1,122' long, 33" to 30" dias.
City of Seattle	Gorge Creek Plant	100 mi. N. E. of Seattle, Wash.	240' high	Two 11,000' long	Not awarded	Three 1,000' long, 11' to 10' dias.
City of Seattle	Ruby Creek Plant	100 mi. N. E. of Seattle, Wash.	450' high, 1,000,000 acre-ft. storage.	Length 17,000'	Not awarded	
Washington Water Power Company	Spokane Upper Falls	In Spokane	Inclined slab and buttresses 30' high	None	I. P. Morris	One 370' long. Reinforced concrete, 18' dia.
Idaho Power Company	Shoshone Falls Plant	Near Twin Falls, Idaho	Concrete diversion dam 20' high	Length 450', 10½x10½', 800 sec.-ft. flow, concrete lined	S. Morgan Smith	One riveted steel line, 172' long, 10' dia. top.
City of Tacoma	Lake Cushman Project	About 60 mi. W. of Tacoma	Gravity arch 210' high, 150,000 acre-ft. storage	Length 5,300', 14x20', 700 sec.-ft. flow, concrete lined	Not awarded	Two initial, four ultimate, 3,200' long, 80" to 48" dias.
Utah Power and Light Company	Olmsted Plant	50 mi. S. of Salt Lake City			I. P. Morris	One riveted steel line 798' long, 6' dia.
Northwestern Electric Company	Underwood Plant	On White Salmon River	Gravity concrete dam 62½' high			Two concrete lines 133' long, 10' dia.
Portland Railway, Light and Power Company	Oak Grove	55 mi. from Portland	Earth fill 22' high	8½-mile conduit		
Pacific Gas and Electric Company	Spring Gap	Middle Fork Stanislaus River	Rock fill dam 135' high, 17,900 acre-ft.	4.7 mi. canal, 50 sec.-ft. flow	Pelton Water Wheel Co.	One riveted steel line 7,253' long, 36" to 30" dias.
Pacific Gas and Electric Company	Drum Plant Unit No. 3	Bear River Placer County			Pelton Water Wheel Co.	
Pacific Gas and Electric Company	Hat Creek No. 1	Hat Creek, 245 mi. N. of San Francisco	Small timber crib diversion dam	Half-mile canal, 600 sec.-ft. flow	Wellman Seaver Morgan	One riveted steel line 1,605' long, 10' to 8' dias.
Pacific Gas and Electric Company	Hat Creek No. 2	245 mi. N. of San Francisco	Small timber crib diversion dam	4,500' of flume, 800 sec.-ft. flow	Wellman Seaver Morgan	One riveted steel line 413' long, 10' to 8' dias.
Pacific Gas and Electric Company	Pit River No. 1	245 mi. N. of San Francisco	Diversion weir	Length, 10,160'; 14' dia.; concrete lined, 1,800 sec.-ft.	Allis-Chalmers	Two riveted steel and lap-welded lines 1,372' long, 10¾' to 8' dias.
Pacific Gas and Electric Company	Pit River No. 2	Shasta County, California.				
Great Western Power Company	Caribou Plant	195 mi. from San Francisco on Feather River		20,400' of tunnel, 7x7' to 10' circular	Allis-Chalmers	Two riveted steel lines 2,082' long, 66" to 42" dias.
City of San Francisco	Moccasin Creek Plant	140 mi. E. of San Francisco	Hetch Hetchy dam 226' high, 20,600 acre-ft. Earth forebay dam 145' high, 2,400 acre-ft.	18 miles of 10x13 ft. tunnel, 620 sec.-ft. capacity	Not awarded	Three lines 4,700' long, 104" to 52" dias.
Turlock and Modesto Irrigation Districts	Don Pedro Plant	Tuolumne River above Lagrange	Gravity concrete dam 283' high, 270,000 acre-ft. storage	Power house monolithic with dam	S. Morgan Smith	Three reinforced concrete tubes in dam 200' long, 6' dia.
San Joaquin Light and Power Corporation	Balch Power House	Kings River	Multiple arch, 150' high, 45,000 acre-ft. storage	Length 27,000', 12' dia., unlined, 400 sec.-ft. flow	Not awarded	Four lap-welded lines 5,425' long, 48" to 24" dias.
San Joaquin Light and Power Corporation	Kern Canyon Plant	18 mi. N. E. of Bakersfield	Diversion dam 15' high at tail-race of Kern River No. 1	Length 8,300', 11' circular, 800 sec.-ft. flow	Allis-Chalmers	One riveted steel line 568' long, 8' to 7' dias.
Southern California Edison Company	Kern River No. 3	130 mi. from Los Angeles	Concrete diversion dam 25' high	12 mi. 8x8½ ft., chiefly lined with concrete, 600 sec.-ft. flow	Pelton Water Wheel Co.	Two riveted and welded steel lines 2,520' long, 7' to 5' dias.
Southern California Edison Company	Big Creek No. 8	241 mi. from Los Angeles	Concrete diversion dam 60' high	Length 5,600', 20x20', unlined, 2,050 sec.-ft. flow	I. P. Morris Co.	One riveted and welded steel line 2,700' long, 8' to 6' dias.
Southern California Edison Company	Big Creek No. 3	235 mi. from Los Angeles	Small diversion dam	Length 30,000', 21x21', 3,000 sec.-ft. flow	Not awarded	
Sespe Light and Power Company	Santa Paula Project	Sespe Creek, Ventura County, California	Six multiple arch dams 115 to 245' high			
City of Los Angeles	Franklin Canyon Plant	On Los Angeles Aqueduct	Earth dam 50' high	Penstock from tunnel direct	S. Morgan Smith	6,250' long, 52" dia. top and bottom
The Southern Sierras Power Company	Forest Home	Mill Creek				
The Southern Sierras Power Company	Leevining No. 1	Leevining Creek				

*Preliminary and subject to change.

WAY IN 1921 OR DEFINITELY SCHEDULED FOR 1922

collaboration with Electrical World and Engineering News Record.

Prime Movers	Static Head Feet	TRANSMISSION LINES		GENERATORS		Present Stage of Development	Ultimate Capacity of Plant, kw.
		Length and Voltage	Type—No. of Circuits	Number Rating	Make and Voltage		
16-25,000 hp. double overhung impulse units	1,200	130 mi. of 150,000-volt steel tower line	2 steel towers	16—20,800 kva.	6,600 volts	Project started middle of 1920	
One 13,000 hp. Francis turbine	110	66,000 volts		1—8,825 kva.	Can. G. E. 4,400 volts	To be in service March 1, 1922	35,400
One double overhung impulse unit	510			1—2,200 kw.		Completed in summer of 1921	
Six 30,000 kva. units	395	165,000-volt line 100 mi. long				Preliminary work under way. 11,000' tunnel contract let	180,000
Six 45,000 kva. units	470 to 720					Gorge plant to be completed in 1923	270,000
One 14,250 hp. vertical reaction turbine	64	Distributed from plant 4,200 volts	One-distribution circuit	1—11,750 kva.	G. E. Co. 4,200 volts	Completed May 1, 1921	10,000
One 14,500 hp. Francis turbine	204	44,000 volts	3 wood poles	1—10,000 kw.	West. Elec. 6,600 volts	Headworks partially completed in 1921	11,100
(Initial) Two 22,500 hp. units	590	100,000-volt line 38.4 mi. long	2 H-frame wood poles	2—16,000 kw.	6,600 volts	Real estate and right acquired. Surveys and test borings under way	56,000
One 7,700 hp. vertical reaction unit	340	Previously built		1—5,500 kw.	G. E. Co. 2,300 volts		
Two 4,200 hp. vertical reaction units	60	One mile 66,000-volt tie line	1 wood pole	2—3,000 kw.	2,300 volts	Final surveys completed	6,000
One 27,500 hp. reaction turbine	860			1—20,000 kw.		To be completed in 1924	
One 9,500 hp. single overhung impulse-wheel	1,865	104,000-volt line 15 mi. long	1 H-frame wood pole	1—7,500 kva.	G. E. Co. 6,600 volts	In service	7,000
One 20,000 hp. double overhung impulse unit	1,375			1—15,000 kva.	West. Elec. 6,600 volts	In course of installation	12,000
One 15,000 hp. vertical reaction turbine	217	220,000-volt (ultimate) 202 mi.	1 wood pole	1—12,500 kva.	G. E. Co. 6,600 volts	In service	10,000
One 15,000 hp. vertical reaction turbine	198	220,000-volt (ultimate) 202 mi.	1 wood pole	1—12,500 kva.	G. E. Co. 6,600 volts	In service	10,000
Two 40,000 hp. vertical reaction turbines	440.5	220,000-volt (ultimate) 202 mi.	2 steel towers	2—35,000 kva.	Allis-Chalmers 11,000 volts	To be completed in 1922	63,000
	115	220,000-volt (ultimate)				*To be begun by June, 1922	20,000
Two 30,000 hp. double overhung impulse wheels	1,008	165,000-volt line 182 mi. long	1 steel tower	2—22,223 kva.	G. E. Co. 11,000 volts	Completed summer of 1921	120,000
Three or four 25,000 hp. double runner impulse wheels	1,325	154,000-volt line 143 mi. long	2 steel towers	3 or 4—20,000 kva.	11,000 volts	Construction under way. Plant to be completed in 1923. Equipment contracts not yet awarded.	150,000
Three 5,700 hp. reaction turbines	160 to 240	About 110 mi., 66,000-volt		3—5,000 kw.	G. E. Co. 6,600 volts	Started June 1921	70,000
Two 44,000 hp. impulse wheels	2,495	110,000-volt line, 32 mi. long	2 steel towers	2—31,000 kw.		Construction to start April, 1922	108,500
One 12,000 hp. vertical Francis turbine	230	66,000-volt line previously built	Wood pole	1—10,600 kva.	Allis-Chalmers 11,000 volts	In service summer of 1921	18,000
Two 22,500 hp. single runner vertical reaction turbines	806	75,000-volt line, 45 mi. long	2 steel towers and wood poles	2—17,500 kva.	G. E. Co. 11,000 volts	In service summer of 1921	32,000
One 30,000 hp. vertical reaction turbine	729	Two miles 150,000 to 220,000-volt tie line	2 steel towers	1—22,500 kw.	G. E. Co. 11,000 volts	In service Aug., 1921	135,000
Three 35,000 hp. units	825	One mile 220,000-volt tie line	2 steel towers	3—25,000 kw.		Tunnel started Nov., 1921	150,000
						Preliminary work started in 1921	Total for six plants 28,500
One 3,000 hp. vertical reaction turbine	230 to 265	33,000-volt tie line, 600' long	Wood pole	1—2,500 kva.	G. E. Co. 4,400 volts	In service June 3, 1921	5,000
One impulse wheel, 4,470 hp.	2,000	87,000-volt				To be begun by June, 1922	3,350
One impulse wheel, 17,900 hp.	1,600	87,000-volt				To be begun by June, 1922	13,400

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

I. THE SALESMAN HIMSELF

In these days of intensive national advertising the time-honored adage becomes more and more true that the surest way for anyone to improve his salesmanship is to improve himself. Try only to remember how many times you went considerably out of your way to make a purchase at a place where you "liked the people," and you will agree that the salesman who would sell goods to people must first "sell" himself.

We all know people whom we like, and other people whom we dislike. But if we try to state the reasons in either case, we find—and to many this will be a discovery—that it is usually easy to explain the causes which make us dislike this or that person, but extremely difficult to put our finger on the specific reasons which attract us towards certain salespeople. In fact, for the average salesman the absence of unfavorable or antagonizing traits is much more important than the possession of some strongly developed attractive points accompanied by some uneliminated irritating or provoking peculiarities. We all know this very well as can be clearly seen from the way we sing the praises of "correctness" in appearance and behavior. We value correctness because it predisposes us toward the "correct" person; and the "incorrectness" of a person prejudices us against everything connected with him or her.

With these ideas in mind, let us now imagine ourselves as buyers, and construct in our minds the picture of a salesman as he comes within our field of vision, approaches us, speaks to us, until finally he departs and leaves behind him certain remembrances in our mind. This imaginary visit will permit us to construct, step by step, a schedule of those characteristics of the salesman himself which impress the buyer either favorably or unfavorably, and which therefore we must either cultivate in ourselves or strive to eradicate from our personality.

Impressions Made on Buyer by Salesman

Supposing that you are the buyer, and that a salesman has entered the office or store where you are, your attention will probably be attracted to him while he is still away in the distance. Nevertheless, certain things about him will even then create some preliminary impressions upon you, whether you are conscious of that fact or not. And mind you that just in this last statement there is embodied one of the most important factors of successful salesmanship: I said, "whether you are conscious or not of

that fact," and I meant it. Subconscious impressions which we create in other people's minds are at least as important as, if not more important than, the conscious impressions they receive. And as it is the primary object of a good salesman to handicap himself as little as possible by any unfavorable factors whatsoever, he must all the time bear in mind these subconscious impressions he makes on the buyer, and try to make them as much in his favor as he can by deliberately foreseeing them.

A conspicuously and loudly dressed salesman is pretty sure to irritate us. We will class him as a "dude" and transfer our dislike for "dudes" to the house he represents and to his goods; we cannot help such a subconscious transfer of dislikes. Or else,—would you like a salesman to come into your office in shirt sleeves? Of course, this point will strike you as very elementary. But check yourself up. Do you ever serve customers, dressed in a way in which you would resent a salesman serving you? Think this point over, be quite frank with yourself, and put your present score down opposite this point. Is it 100? or 90? or only 70 or 50? And if it is less than 100, rate yourself again after a while. Try and see whether you cannot bring it up to 100 and keep it there.

Salesman's Bearing

We hardly ever consciously observe a good, vigorous bearing of a man; and therefore we rarely appreciate the fact that a good, semi-military bearing predisposes us towards people who always exhibit it. Without realizing it, we associate erect bearing with bodily health and fitness, and a slouchy bearing with a slouchy personality whom we do not trust very much. Catch a glimpse of your habitual bearing in a mirror. Can you rate it at 100? Put your present score down quite frankly, and watch it grow. You are the only person who can improve it.

Watch the hypothetical salesman who just entered your office or store, hesitatingly and without assurance, turn first one way and then another, shuffle his feet, etc. Do you feel quite sure in advance that he has nothing to offer you that you would care to buy? How are your own movements in the presence of buyers? Are your movements dignified and full of assurance? Or do you tempt people into turning you down merely under the impression of your movements as they see them? Do not neglect to rate yourself frankly on this point now. It will help your self-improvement.

Salesman's Neatness

To continue our little imaginary playlet: the visiting salesman has asked the girl near the door who the boss of the place is, and now he is walking up to you. As he approaches you, the buyer, certain additional impressions are registered in your mind, and it does not matter whether you are conscious of them or not. They do register, and they do influence you in your dealings with that man.

It will be readily acknowledged by everybody that slovenliness on the part of the salesman prejudices the buyer against him and his proposition. At least, we are ready to admit this when we are the buyers. We do not pay any deliberate attention to this point, but let the salesman who approaches us look as if he had "slept in his clothes," and see how quickly we try to get rid of him! Of course, you know perfectly well what "neatness" of appearance means, but do we always apply that knowledge when we are the salesman? What will you rate your customary neatness at? 100? 75? 50? Put that present score down now, pay attention to your appearance, and see how the score will rise!

Salesman's Manners

Theoretically we all agree that courtesy is never degrading. But have you noticed that courtesy is so rare that when we meet with it our attention is invariably aroused, and a very favorable attention at that? "Manners" does not mean "mannerisms," neither does it mean freakish manners. The buyer is your real employer. It is he who pays your profits or wages for the service you render him. Be always respectful and courteous to your real employer, the customer, while you serve him, and show this in your manners. I do not even want to waste your time by telling you what is good manners, and what is not. I am quite sure that it is only necessary to remind you of this point, and also to warn you never to vent your temper aroused by purely personal matters, upon your customers: it simply does not pay.

How do your manners with your customers average now? What is your score?

Salesman's Voice

Our imaginary salesman has approached your desk, and addresses you. His first words will probably be a very ordinary greeting, and you will hardly pay attention to it, answering it quite mechanically. But suppose that his voice grates on your nerves by its high pitch, or else that he mumbles his words so that you have to ask him to repeat what he said. Will you not agree that he may readily lose his sale right then and there?

We all like people whose voice is clear, distinct, and well modulated. Subconsciously we jump at the conclusion that a person with such a voice is both sincere and competent. Do not think that a proper use of your voice is something in the nature of play-acting. Remember that public speakers, teachers, and ministers deliberately cultivate their voices because they realize how important a pleasant and sincere voice is to them when they sell their audiences their ideas. You do not need a vocal instructor to improve your voice, simply pay attention to your

own way of speaking, and you will very quickly notice any defects and be able to eliminate them to a great extent.

Contact Impressions

Our imaginary visiting salesman has now come up to you and has greeted you. He is now in close contact with you, physically speaking, and you notice, without trying to do so, a number of things about him. These "contact" impressions are probably the most important ones among all the impressions you receive from your visitor, they exert their influence on you during all the time of your conversation. Hence it is so essential to the salesman's success that they be favorable to him.

Of course, it is "old stuff" that we have to be clean. We were carefully drilled in that when we were kids. But then—we were not liable at that age to forget that we had a two-day old beard on our chins, or that in the rush of things we have forgotten to put on a fresh blouse. There are a number of other things which on close contact may impress the buyer against us, tobacco odor, cheap and strong perfumery, other unpleasant odors, etc. Among other things, some salesmen seem either to believe that grease-stained hands and black finger nails are an honorary and respected badge of honest toil, or else not to know that such stains and dirt can invariably be removed by special cleaners purchasable in every drug store. Look yourself over several times during the day, are you always at the 100 point score on the count of general cleanliness?

Behavior While Selling

Again, we all know how to behave. No use even to talk about that. So this point is put down here only that you may not forget to grade yourself on that score. You see, we all know it, but we do not always think of it, whereas it is essential that we always behave politely and respectfully with our customers.

I do not mean that you should not use "improper" language. That is not the point. Use language which is clear and adapted to the customer you deal with. With simple folks use simple and direct language; with the "better class" of buyers use more dignified and less insistent language. Avoid slang and technicalities. We are all so liable to do this, forgetting that slang is offensive to many, and that technicalities are clear to us but not to the layman. This point deserves particular attention on the part of salesmen who sell technical apparatus and machinery.

A hydroelectric station at Fully in Switzerland operates under the abnormally high head of 5410 ft. The power house is situated in the Rhone valley not far from Martigny, and the water power is obtained from a lake at an elevation of 7000 ft. above sea level. Near the lake, but nevertheless submitted to appreciable pressure, is a tunnel 1650 ft. long, the iron-pipe line to the Pelton wheels being nearly three miles long. There are four waterwheels in the power station, each of 3000-hp. capacity. The water leaves the nozzles with a velocity of 590 ft. per sec.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Kilowatt-hour as Power Measure Readily Visualized

There are few commodities which the average man pays for that he knows so little about as he does about the kilowatt-hour; and yet there is no commodity of any nature that he buys that is more definite in character than the kilowatt-hour.

The early inventors of the steam engine turned to things familiar in their selection of a unit of power and by actual experiment they determined the amount of work done by the English dray horses of that period and they called the average amount of work done by one of these animals a horse power. Unfortunately, the kilowatt-hour does not visualize such a concrete picture of power but when it is considered that a kilowatt is $1\frac{1}{3}$ horsepower there is produced a mental picture of this unit of power. The horse power is defined as the amount of work which is done in lifting a weight of 33,000 pounds through a distance of one foot in one minute. The kilowatt is, therefore, the amount of work done in lifting a weight of 44,000 pounds through one foot in one minute or the work done in lifting 440 pounds through a height of 100 feet in one minute.

Now, if the kilowatt is put to work for one hour instead of one minute it will have the power to lift 26,400 pounds to a height of 100 feet. If a 25% loss is allowed in the motor and the elevating machinery it still has sufficient power to actually hoist 200 98-lb. sacks of flour from the basement to the eighth floor of a flour mill or to lift 3200 50-lb. lugs of fruit from the first to the second floor of a warehouse.

Unique Tower Line Construction Adopted in Honduras

Unique methods in overcoming power line construction difficulties have been adopted by the New York and Honduras Rosario Mining Company in the mountainous section of the Central American republic. Hydroelectric power is used to operate the mine and mill, and the power is carried over a distance seven miles through extremely rough country. The timber for miles around has been removed for use in the mine and owing to the lack of transportation facilities, timber for poles was extremely scarce.

In early days the Spaniards had imported from Australia large numbers of eucalyptus trees which had grown to a size sufficient for utilization as poles. However, tests showed that these poles were readily destroyed by the abundant insect pests as well as rotting very rapidly, when set in the ground.

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

This difficulty was overcome by securely bolting to the butt of each of the poles two pieces of ordinary rail five feet long. Holes were dug and the rails set in concrete, the butts of the poles being allowed to remain at least six inches from the ground. A further



Transmission line poles in Honduras are bolted to steel rails set in concrete, leaving the pole six inches above the ground to afford protection against insects and the weather.

protection against insects was afforded by creosoting the butts of the poles.

Another distinctive feature of these towers is the angle at which the lower cross arm braces are set. This puts the three conductors in three different planes and helps to prevent their coming in contact with one another during wind storms.

FREDERICK KRUG.

San Juancito, Honduras, C. A.

New Process for Utilization of Sawdust as a Fuel

Fuel conservation is one of the vital questions of the present industrial era. Similarly important are the questions of waste in industry and the recovery of by-products. There have been developed in England and in Sweden processes which might well be classified under all three of the above headings. These processes consist of the utilization of sawdust, chips and wood shavings, as fuel at the same time recovering valuable by-products.

On the Pacific Coast, at present one of the principal lumber producing sections of this country, little or no attempt is made to utilize this cheap fuel and in many instances, great quantities are wastefully burned around the larger lumber mills. Of late there have been some experiments in the Pacific Northwest with the so-called "hogged fuel" which have proved highly successful. Yet the processes devised in Europe are even more far reaching than the simple burning of the sawdust and chips beneath boilers for the production of steam which in turn is used to generate electricity.

They consist of the production of gas from the sawdust, which is used to drive internal combustion engines and electric generators, with the added advantage that provision can be made for the recovery of tar, wood naphtha, acetic acid and other by-products. At the same time the remaining ash is used in the manufacture of fertilizer.

One of the most complete installations of this kind is located at the timber mills of John Sadd and Sons, Ltd., Maldon, England. That the process has proven highly successful is indicated in the fact that the initial installation of two sets of 100-hp. waste-wood gas producers with the corresponding internal combustion engines and generators, has been increased until the present gas producer plant contains machinery rated at approximately 1050 hp. as well as two auxiliary 150-hp. producers. Over 900 hp. in electrical energy at 440 volts potential are produced.

The gas from the producers is passed through a dust collector, then into a coke scrubber, through a motor driven tar extractor, and finally through a wood-wool scrubber before passing into the engines. The gas produced is of such excellent quality that the engines produce well over their nominal rating.

The crude tar produced sells for approximately \$5 per barrel while the ash brings \$15 a ton as fertilizer. Other by-products are not recovered at this plant, although the company is considering installing the necessary equipment for the recovery of naphtha.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

California Campaign Essay Contests Successful Secures Valuable Publicity From Electrical Cooperative Campaign Competition in Los Angeles and San Francisco

The effectiveness of the essay contest as a means of obtaining publicity for the electrical appliance idea has been demonstrated by the California Electrical Cooperative Campaign which has just completed two such contests, one in Los Angeles and the other in San Francisco. Each was conducted in conjunction with a local newspaper.

The San Francisco contest, made possible by the cooperation of the San Francisco Bulletin, was held between December 5 and December 20. It brought forth a total of 520 essays from all parts of California together with some from Nevada, Iowa, Illinois, South Dakota, Indiana and New York. A total of thirty-four prizes, all electrical appliances, were donated by power companies, manufacturers and jobbers. The Cooperative Campaign, through the contests, secured approximately 527 inches of publicity in the newspaper, which, at the lowest contract advertising rate would have cost \$1476.

The Los Angeles contest was conducted through the agency of the Los Angeles Express and brought forth over 1000 essays with a scattering representation from states as far east as Pennsylvania. Sixty prizes were offered in the southern California city. This contest netted the campaign approximately 517 inches of publicity, the cost of which would have been \$834 if space had been purchased at regular advertising rates.

The essays were on the subject, "Why

Electricity Is the Modern Servant in the American Household." The essay which won the first prize in the San Francisco contest follows:

"I am a white-haired grandmother. By day I sit in my big, soft chair before the heater's pleasant glow. Around me play my daughter's three small children.

"Their mother often joins them in their games, or sits and reads to me. At other times she will say, 'See to them, grandmother. I'm out for the day.'

"She is a better housekeeper than I, her mother, who always was prideful of my home. Her family is better cared for than was mine. She is a loving wife and mother. Her responsibilities are many and she bears them well. Yet she has leisure twice greater than was mine at her age. From my soul I envy her this leisure.

"I found no time for many of the finer things she enjoys so fully—good books, congenial friends. I always was 'too busy.' In my youth only the very rich—those with many servants—could have the leisure which is my daughter's.

"She is not rich. She has a single servant. The pay is small, the hours long. Her servant is Electricity. Baking, washing, cleaning, mending, heating—there is, in fact, scarcely any household task at which this servant does not aid. Electricity assumes the drudgery, the chores. The pleasant tasks alone remain.

"My span has been a full one. I have seen great changes. The greatest to me is the housewife's altered state. No longer need she be a drudge. Each may have a servant."

Eastern Editor Gives Western Idea New Interpretation

Carrying to the East the Electrical Home idea, the inspiration for which he received during a visit to the West, O. H. Caldwell, editor of Electrical Merchandising, has begun a movement advocating the electrical home for the electrical man, a thought which the West might well adopt.

Arguing that the ownership of an electrical home is a business obligation which the electrical man owes to his friends and the people of his community, a recent editorial from Electrical Merchandising, in presenting this Western idea of the Home Electric, in a new light, states:

"We can never expect the lay public to adopt and use these electrical appliances and conveniences unless we ourselves first adopt and use them. We cannot look to the non-electrical family to 'Do It Electrically' when the electrical man's own family is bereft of the wonderful labor-saving conveniences which we are in the business of manufacturing and distributing.

"We firmly believe that one of the most effective ways for the electrical industry to get the Home Electric idea accepted by the general public is for the men of the electrical industry to try out their own prescriptions and take their own medicine—and this means Electrical Homes for Electrical Men."



O. H. Caldwell, editor of Electrical Merchandising, became acquainted with the electrical home idea during a visit to the West. Now he is giving this idea a new interpretation in the East by advocating electrical homes for

electrical men. He practices what he preaches for the above two views are taken from his own home. Even the children in the nursery are taught the conveniences of electricity. Insert shows Mr. Caldwell himself.

Attractive Store Displays of B. C. Contractor-Dealers

Merchandising Methods Fostered in Canadian Province by Electrical Service League of British Columbia Aid Vancouver Merchants in Increasing Sales



Situated in Vancouver's fashionable home district, the P. F. Letts Electric Company specializes in home illumination and interior decoration, using the entire store to display artistic home fixtures.



Few cities the size of Vancouver can boast of an exclusive electrical contractor-dealer store in the heart of the fashionable shopping district, such as the Electrical Supply and Contracting Co., Ltd.



The convenience of the customer has been considered by Hume and Rumble in laying out the interior of their store to display their stock.



The British Columbia Electric Railway Company, Ltd., Vancouver's central station, maintains one of the largest showrooms for appliances on the Pacific Coast. Particular attention is paid to interior arrangement.



A corner of the showroom of the central station shows the manner in which the comfort and convenience of customers is attended to in aggressively promoting the use of power consuming devices.



Out in Westminster, Hume and Rumble have set up a contractor-dealer establishment to serve the needs of this residence section of Vancouver, at the same time rendering a definite service.

Unique Plan for Furnishing Denver Electrical Home

Drawings for the appliances to be displayed in Denver's first electrical home, which will be opened within the next thirty days, was the feature of the December general meeting of the Electrical Cooperative League in Denver. Over one hundred were present and the competition in drawings, together with enthusiasm over the co-operative advertising campaign, made the meeting even more successful than those held in previous months, according to reports.

The League sent out questionnaires before the meeting to all its members asking what each one thought as to the appliances going into the home. The replies received enabled the committee, consisting of John J. Cooper, Alex Hibbard, N. R. Crooks and R. W. Elliott, to tabulate the equipment for the home. For those items in which only one firm was interested no drawings were held. Likewise when one firm drew one of the major appliances, such as the range or washing machine, it was precluded from further drawing on that class of equipment.

The committee now has a list of fifty different appliances which will be placed in the home, ranging from the heavy laundry equipment to a boudoir incense burner. It was announced that these appliances would not be installed until all the furnishings had been placed in the house by the Daniels & Fisher Company, one of Denver's leading department stores which believes so thoroughly in the electrical home idea that the merchandising manager, A. B. Trott, has laid out on the furniture floor five rooms with walls and all the features of a home, excepting that one side of the room is left open. Proper lighting and plenty of convenience outlets are provided for this novel store demonstration.

Montana Power Company Installs Novel Heater Display

Unique methods to stimulate the sale of electric heaters were recently adopted by the Montana Power Company in Butte during the heavy storms which have been sweeping that section of the West. A line of electric heaters mounted on pedestals, waist high, has been placed along the outer edge of the sidewalk, extending the entire width of the building. The heaters operate throughout the day and give striking proof of the versatility and efficiency of electricity.

The efficiency of the heater is convincingly proved in the company's present display. During the recent heavy storms, with wind, sleet and snow playing havoc with traffic and discommoding pedestrians, the line of twenty-four heaters defied the elements and gave out a constant flow of warmth.

The display does not stop with the line of heaters, however. The windows of the office display cards explaining the various features of the heaters. Cost figures are prominently displayed, the statement being made that the heater costs six cents per hour to operate them connected to a lighting circuit. Merchandising methods which capitalize the elements in this manner are certain to increase sales. Seasonal sales campaigns have again proven successful.

The Contractor-Dealer and His Advertising Plan

The Elements of Good Advertising and How They May be Applied to This Branch of the Electrical Industry

By W. D. MORIARTY

Field Representative, Northwest Electrical Service League

An advertisement must attract attention. This is the first law of advertising. You can get attention by large space, by distinctive borders, by distinctive type, by distinctive use of white space, by distinctive catch lines, but by some means or other you must get attention. Use your brains to decide on the cheapest and best way, not the cheapest way but the cheapest and best way.

It may be that it will pay you to buy a distinctive border, even a border in cut form to make sure no one else will use it. If you do, it is cheapest to get a good one, something you can take pride in. It may be that in your locality it pays to use cuts furnished by the manufacturer. This is your business to decide, no rules of advertising can take the place of your own personal brains on your own personal problems. But either distinctive border or distinctive illustration is almost essential to best results in most publications.

An Advertisement Must Create Interest

This is another way of saying that an advertisement must crowd other things out long enough to give the thing advertised, or the store advertised, a fair chance at the customer's mind. It is not enough for an advertisement to attract attention, it must attract attention to the thing advertised and hold that attention long enough for the idea "to soak in." Beware of making your advertisement too short. As long as you are really saying something, keep at it.

Here also is the great reason for using the same idea again and again in advertising, "ringing the changes" on it. Say it again but say it differently and the idea gets one more chance. Repetition, just sheer repetition, has an undeniable effect, and intelligent repetition that retains the interest of the reader is one of the great advertising forces which any man can use.

Repetition is one of the most powerful factors in creating belief. In spite of the Roosevelt panic there are millions of Americans who believe that the only way in which really hard times can be brought about is by the election of a Democratic president. Reputations are destroyed by repetition, reputations are built up in the same way. Get busy and build yours, don't leave it to your friends.

There are other ways of creating confidence. The advertisement must "ring true," must have personality, must be backed up by store policy and store salesmanship. But some advertisements have nothing in them that calls for belief, and such an ad can not possibly be a good one. "John Jones, electrical supplies, wiring a specialty" is an announcement but not an advertisement.

The slogan is one way of securing repetition, and a valuable way if the slogan is intelligently used and really backed up. I have seen stores, however, that used "Everything Electrical" which were a long way from that stand-

ard in every direction, hopelessly inadequate stock, their show cases unlighted, etc. A slogan is a war cry and must be sounded and fought up to. By all means get a slogan if you can get one that fits your business policy, but don't take one that doesn't fit and use the one that does fit aggressively.

An Advertisement Must Be Remembered

Here is another reason for everlasting repetition. You must establish your reputation so firmly in the minds of your customers that when they think of something you carry they will think of you. It is not enough if when they think of a washing machine they think of the one you carry. They may think all they please of that particular washing machine but if they think of your competitor and go to his store, what chance have you if he happens to be a real salesman?

The advertisement must inspire confidence in the reader and it must be remembered, but the most important thing in the advertisement in both these vital respects must be you and your store. This is the vital reason why you must TALK in your advertisements. Mere display advertisement is generally poor advertising, in all fields and especially in yours. A customer must have a REASON for trading with you, and an announcement is not a reason.

Test your advertising by imagining yourself reading it to customers as the beginning of your sales talk. It isn't advertising if it will not stand this test.

If a customer has read your advertising you should not talk to him as if he hadn't. Don't waste the good impression with which he comes to your store. Build on it. Capitalize it.

To advertise convincingly you must believe your advertising will sell your goods, just as you must believe your sales talk will sell your goods. What would you think of a salesman who ambled forward saying to himself, "Well, here goes. I haven't very much faith in this talking business but everybody else does it and I suppose I ought to do a little." Yet this is the way many advertisers advertise.

If you get someone else to do your advertising, either a clerk or an outsider, see to it that every salesman in your employ is sold on the idea that advertising helps. If you can't sell your clerks and yourself, how can you expect to sell others? And this is the point to sound the warning "Beware of 'bunk' in advertising." An advertisement that a clerk doesn't believe is a boomerang on your business. Sell your advertising to yourself first of all, then to your clerks, and then build on it when you sell to your customers.

EDITOR'S NOTE

This is the second of a series of articles by Mr. Moriarty on advertising for the contractor-dealer. The third article will appear in an early issue of the Journal of Electricity and Western Industry.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Far East Offers U. S. Market

Hydroelectric Developments in Lands Bordering Pacific Announced

That the countries bordering on the Pacific ocean constitute one of the greatest markets in the world for American hydroelectric machinery, is the opinion of United States Department of Commerce officials as set down in a statement recently issued regarding hydroelectric development proposed or under construction in the Orient and other countries bordering the Pacific. Japan, China, India, Java and other East Indian islands, Australia and New Zealand are markets where such machinery might be disposed of at the present time, the report states.

While contracts with either the government or privately owned companies in the various countries are announced from time to time, these markets have not been as highly exploited by American companies as they have by foreign concerns, in the opinion of the commerce experts.

They point to South America where British and German firms have developed large markets for special machinery, while American companies, through lacakadaisical methods, have lost millions of dollars in contracts. They add however that American firms more recently have become competitors with these firms.

New Zealand forms the important market at the present time for hydroelectric machinery, department of commerce records show. The government of that British province has recently announced plans for the development of a hydroelectric system totaling 270,000 horsepower in order to conserve coal. Eight separate developments ranging in size from 1000 to 96,000 horsepower capacity will be undertaken during 1922 and 1923.

New Rubber Manufacturing Plant For Pacific Northwest

Rubber manufacturing is to be a new industry in the Pacific Northwest, according to an announcement made by A. M. Elliott, president of the newly organized Pacific States Rubber Company, that his company will immediately start the erection of a \$500,000 factory at Vancouver, Wash.

The Pacific Coast ports are the principal points of entry for crude rubber to this country from the Straits Settlements and the islands of the Pacific. Most of this rubber is taken to eastern manufacturing centers at the present time, made into finished products and returned to the coast for sale and export. Excessive freight rates have added considerably to the cost. By establishing a factory in the West, it is be-

lieved that tires, tubes, and other rubber articles can be produced much cheaper than the eastern products. The shortage of suitable cotton fiber for the manufacture of automobile tires is no longer one of the reasons for lack of rubber factories on this coast as such cotton is being produced in large quantities in southern California and Arizona.

The Pacific States Rubber Company, which is planning the erection of the Vancouver plant, is capitalized for \$2,500,000.

Denver Will Have \$10,000,000 Electric Smelter

Denver will shortly be the Pittsburg of the West, according to Charles E. Havener, president of the Utah-Colo-rado Mining and Milling Company, who has announced that his company is planning the erection of a \$10,000,000 electric smelting plant to be constructed in that city during the coming year. Electrolytic steel will be one of the chief products of the mills.

According to the announcement a 120-acre site has already been purchased for the plant, and plans are being drawn. Alfred Bell, noted mining engineer, will be in charge of the construction. The plant when completed will comprise 42 separate buildings, will employ 600 men and have a capacity ranging from 25,000 to 50,000 tons of ore daily.

Urge \$5 Per Ton Freight Rate on Copper to Los Angeles

James S. Douglas, pioneer Arizona mining man, has presented to the Los Angeles Chamber of Commerce a plan to make that city the copper center of the Pacific Coast provided a \$5-a-ton freight rate can be secured on the unrefined red metal from the Arizona and Utah mines to the port of Los Angeles. It is planned to erect refineries and mills at that point and ship the metal by steamer to all parts of the world.

The total value of the copper output of Arizona during normal times has been placed in excess of \$100,000,000 annually and it is planned to make the southern California city the outlet for this product. Mr. Douglas points out that during the war, when copper prices were at the highest point, freight rates to eastern manufacturing centers and shipping points were \$16.50 per ton. He points out that this rate covered a haul of approximately 3000 miles against a haul of 540 miles from the mines to the Pacific Coast. He urges that with an abundance of electric power for the operation of a refinery and allied copper manufacturing plants, a new industry can be given to the West.

Portland Industries Growing

Consumption of Power Increases Despite Closing of War Industries

The after-the-war slump hit Portland and many other communities a staggering blow, but Portland's record as indicated by reports of electrical energy generated by the power companies serving this industrial community are extremely gratifying to those who have money invested here in either power companies' securities or commercial enterprises. The figures compiled by the local power companies for the Chamber of Commerce would seem to substantiate Portland's claim that it is built up on diversified industry and on such a substantial basis that the growth continues in spite of economic disturbances. The following figures are taken from a recent issue of "Commerce":

"The first two weeks in November, 1919, compared with the first two weeks of November, 1921, show an increase of 14 per cent in kilowatt-hours generated. When it is realized that during the period of November, 1919, to November, 1921, large plants engaged in shipbuilding and allied industries closed down completely, causing a decrease in power generation of approximately 3,000,000 kilowatt-hours per month, the steady uniform growth of the power business, made up by small increases scattered over a widely diversified list of local manufacturing plants, is most surprising to those who do not know Portland.

"During the period above mentioned, one plant using 500,000 kilowatt-hours during the first two weeks of November, 1919, disappeared entirely from the list in 1921. Another plant using 275,000 kilowatt-hours no longer appears. Still another using 200,000 kilowatt-hours is no longer purchasing current.

"There are many others not showing 100 per cent loss, like the case of one establishment that used 150,000 kilowatt-hours the first two weeks in November, 1919, and purchased only 300 kilowatt-hours the first two weeks in November, 1921."

In view of these figures, it is difficult to realize that residential and commercial loads have grown to such an extent and hundreds of other industrial establishments have gone ahead sufficiently to absorb the terrific loss, and show an actual net gain.

Shipping Combine Meet Set For January 19 in S. F.

Representatives from the Chambers of Commerce of Los Angeles, San Diego, Oakland, Portland, Spokane, Tacoma and Seattle will meet in San Francisco on January 19 with the Chamber of Commerce of that city for the purpose of discussing the proposed \$30,000,000 pooling of the shipping interests of the Pacific Coast which has been proposed by Herbert Fleishacker, president of the Anglo and London Paris National Bank and vice-president of the Great Western Power Company.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

The Journal of Electricity and Western Industry has arranged to furnish its readers with a resumé of legislation, happenings, and activities in Washington, D. C., which might vitally affect the development of the West. Paul Wooton, representing the McGraw-Hill technical papers in the capacity of correspondent, will furnish this service at regular intervals.

Colorado River Meeting

The outstanding engineering development in Washington of current interest to the West is the announcement by the Secretary of Commerce, Herbert C. Hoover, that the Colorado River Commission will hold its first meeting in Washington January 26, at which time a systematic plan of action will be outlined. Secretary Hoover states that the Commission will arrange at this meeting for a series of hearings in the Southwest so that an accurate idea of public opinion as to the utilization of the waters of the Colorado river may be obtained.

Federal Power Commission

Applications for license and preliminary permits under the water power act had reached a total of 269 at the end of the year. Eighty per cent of these applications have come from the western states and Alaska. The Federal Power Commission's first year has been characterized by unexpected difficulties of a highly controversial nature. As a result, the uncertainties which have been hanging over water power development for so long have not been cleared up as had been hoped. The chief difficulty has centered around the regulations promulgated for the administration of the Act. There have been sharp differences of opinion between the executive secretary of the Commission and representatives of the electrical industry, particularly in the matter of depreciation and amortization reserves.

Frequent experience in the past has shown the fallacy of effective administration on the part of a commission composed of Cabinet officers. The duties which have first call on their time are so multitudinous as to preclude any sustained attention to commissions. While Congress is very well aware of this condition, it was thought in the case of water power administration that it would be better to vest the authority in the heads of the three departments which had been handling this type of development. The Federal Power Commission has proved no exception to the rule and meetings have been postponed more frequently than held on the dates specified. There is great difference of opinion in and out of Congress as to the handling of the staff of the Federal Power Commission. The Act provides that the Commission must draw the greater portion of its personnel from the departments of War, Interior and Agriculture. These departments have plenty of work of their own to keep their technical men employed and they are disinclined to loan them to the Federal Power Commission. The Commission contends that it should be

allowed to have its own appropriation and employ its own personnel. Due to the limitation of personnel, the Commission contends that it is able only to act upon applications and conduct a very limited amount of field work. Valuations and other investigations provided in the Act cannot be undertaken under present conditions.

Recently the full Commission heard the views of the representatives of the electrical industry on the matter of depreciation. A decision in that important matter is expected in the near future. It is believed that this will have an important bearing on clearing the atmosphere and at least establishing the administration's policy with regard to the jurisdiction of the Commission.

At the end of the year applications were on file covering projects having an estimated installed capacity of nearly 17,000,000 hp. The primary power involved in these applications was in excess of 11,000,000 hp.

Metric System

Very exhaustive presentations of views for and against the compulsory adoption of the metric system as the sole standard of weights and measures in the United States have been made before a sub-committee of the Senate Committee on Manufactures. Senator McNary of Oregon is the chairman of the sub-committee, who has been in active charge of the hearing. The hearing has been based on a bill introduced by Senator Ladd of North Dakota, which provides that the metric system be put into effect by law ten years after the passage of the act.

The hearing has had the effect of building up a very complete record on this much controverted subject. It is a generally held view, however, that sentiment in Congress at this time is unfavorable to the establishment of such a change by legislation.

Gold and Silver Output

Preliminary figures issued by the Bureau of the Mint and the U. S. Geological Survey indicate that the 1921 gold production was less than that of 1920 by more than \$2,000,000. Despite the fact that the Pittman Act provided an immediate market for silver at \$1 an ounce, the silver production in 1921 was 5,000,000 fine ounces less than that of 1920. The exact figures for the 1921 output are: gold, 2,375,479 ounces; silver, 50,364,389 ounces. The extent of the decline in precious metal production may be judged by comparing the 1921 output with that of the record established in 1915 when the country produced \$101,035,700 worth of gold and 74,961,075 fine ounces of silver.

Water Power Census

The U. S. Geological Survey will issue during February a census of the developed water power in the United States. This census will include only plants of 100 hp. or more. The survey, however, will make available much pertinent information with regard to approximately 1,000 of the principal water-power plants in the country.

Telluride Power Co. Granted 16% Rate Increase

The Telluride Power Company, which serves a large portion of southern Utah, has been granted an increase in rates by the public utilities commission of Utah, which will increase its revenues by about 16 per cent.

The new rate for residential lighting runs from 14 cents per kilowatt-hour for the first thirty kilowatts of monthly consumption down to nine cents per kilowatt-hour for all consumption per month in excess of sixty kilowatts. Commercial lighting rates have a similar range, but with different consumption factors. Several of the present schedules, such as those for commercial lighting with optional load factor rate, sign and display lighting and municipal incandescent street lighting, are not changed.

The Deer Trail Mining Company, which takes about one-third of the output of the Telluride company, will not be affected by the increase in rates, but the company is ordered to publish a schedule embodying the terms of the Deer Trail contract, of which any customer may take advantage if he cares to.

A. R. Heywood, president of the public utilities commission, dissented from the opinion of the other two commissioners who granted the rate increase as the majority.

The majority report says in part:

"During the war period a customary objection made by a class of protestants at rate hearings was to the effect that prices of every kind were advancing with great rapidity, and the public generally was carrying heavy burdens. This being true, the commission was asked to deny relief, regardless of the showing made, until after the 'war was over'; then rates might be adjusted to meet outgo.

"Since the war this class of objection has taken the form that, though the war is over, the time is not yet to adjust rates, but that sometime, when prices are stabilized, income might be adjusted to outlay, and, further, that in unregulated industries prices are now generally declining. In adjusting rates during the war period the commission allowed only the necessary minimum increases to meet enormously advanced prices for materials and labor to the utilities, and those increases became only generally effective after increased prices to the utility had occurred."

The commission finds that the book value of the company is around \$1,100,000 when proper deductions are made, but does not establish this as the value of the property. It shows calculations to the effect that, after cost of operation and reasonable depreciation are allowed, the company in 1920 earned only 5 per cent on a valuation of \$402,000. The company asked additional revenue to yield about \$60,000.

As nearly as may be calculated from the commission's decision, the additional revenues granted through the increased rates will amount to about one-half of that amount.

Reduction in freight rates on electric appliances, supplies and machinery from eastern points to the Pacific Coast have been announced by the Southern Pacific Company. The old rates on electrical appliances, electrical machinery and supplies, including empty electrical storage and battery boxes at present range from \$3.25 per 100 pounds from New York to \$2.66 from Kansas City. The new rates will range from \$2.89 to \$2.40 from these points.



Electrical interests of Denver perfected the illumination scheme which was used to effectively set off the city's civic center and at the same time enhance the attractiveness of the municipal Christmas tree.

Holiday Illumination of Denver Civic Center Applauded

What is considered by many the foremost example of cooperation in civic development in the United States, was the electrification of the Civic Center in Denver during the holidays.

Ornamental lighting standards were clothed with evergreens and the lamps were changed to red and green, while the Greek theatre and Voorhies Memorial were artistically draped in such a way as to take advantage of the unusually effective lighting arrangement.

The most prominent feature in the display was a 70-ft. Christmas tree illuminated with 1800 vari-colored lamps

and surmounted with a white star of dazzling brilliancy. Streamers radiated from the tree itself to an outer circle of trees which were backed by the classic structures of the Civic Center.

The Denver Gas and Electric Light Company made the installation, in conjunction with the city authorities. City firemen assisted in the work. The Electrical Cooperative League of Denver supported the movement as part of its civic development program, and it is reported that T. O. Kennedy, the League chairman, through his company and with D. C. McClure, his assistant, is entitled to a large portion of the credit for producing such an effective display.

Wage Cuts Announced in Many Utah Mining Districts

Wage cuts by mining companies operating in the Bingham district, effective January 16, 1922, have been posted as follows:

A reduction of 50 cents a day in the wages of all men receiving more than \$3 a day; a reduction of 40 cents a day in the wages of those receiving less than \$3 a day.

Six mining companies announced the reduction, which concerns at this time 585 men, distributed as follows: Utah Consolidated, fifty men; Utah Apex, twenty; United States Mines Company, 350; Bingham Mines, sixty-five; Utah-Boston, forty; Utah Copper Company, sixty. A similar reduction has been announced in the Tintic district.

Opening of Denver Electrical Home Delayed 30 Days

The opening of Denver's first electrical home has been delayed thirty days owing to slower developments in finishing the home than was originally anticipated by the officers of the Electrical Cooperative League, under whose auspices the home is being built.

Roughing-in the electrical work, according to reports, required three times the amount of labor used in building the average house. This may be more easily understood when it is known that the house has 22 lighting circuits and nine power circuits with a total of over 150 outlets.

Conduit was laid on top of the false floors, which with stripping brought the regular flooring flush with the door sills, a feature in the construction of the

house. Pictures were taken before sealing the walls and floors to have a lasting record for reference in urging future construction of that type.

As an example of the cooperation developed in the building of the home, it was recently announced by the League that the local electricians' union had subscribed for a block of stock in the home and that a number of the individual journeymen had also made subscriptions.

S. F. League Censures California Senator for Armament Stand

The San Francisco Electrical Development League has gone on record as opposing the stand taken by Hiram W. Johnson, United States Senator from California, regarding the disarmament conference. A resolution censuring the California Senator was passed by the league at a recent meeting and copies sent to Washington. A short time ago the league members sent resolutions to Washington congratulating President Harding and Secretary of State Hughes for the steps which the conference was taking. The resolution was passed by the league follows:

"In view of the fact that Senator Hiram W. Johnson, United States Senator from California, has publicly stated that he is not in favor of the present limitation of armament as proposed at the National Capitol and is openly criticizing the proposed articles that have been drawn up by the Disarmament Conference.

"Be it resolved by the San Francisco Electrical Development League, composed of seven hundred men interested in the development of central California, that we by open vote in our organization show our disapprobation of Senator Johnson's public utterances regarding the Disarmament Conference and hereby express to Secretary Hughes and his associates our wholehearted and enthusiastic endorsement of the disarmament work of the Conference."

Building and Construction Body Formed in Portland

At the instigation of the Portland chapter of the American Institute of Architects, an association has been formed and designated as the "Building and Construction Association of Oregon." The association is formed to secure greater efficiency in building and construction and through its fields of activity will seek to accomplish this objective as follows:

To foster and to organize proper educational facilities for those engaged in building and construction.

To assist wherein it may, in the organization and conduct of a "Guild of Building Handicrafts," and other similar organizations, as a means to elevate the standard of craftsmanship and of securing recognition for the skilled mechanic.

To conduct or have conducted exhibitions, expositions, conferences or campaigns to bring before its members and the public, the problems and achievements in building and construction.

To conduct and aid scientific and economic research and surveys pertaining to building and construction, and to provide for distributing to its members and the public the result of such research and surveys.

To make possible a social contact between the various elements engaging in building and construction.

The constitution provides that the association shall never declare itself for or against the closed shop or open shop issue, and that it shall never pass resolutions or orders of a mandatory character carrying conditions pertaining to inter-relationships of organizations or units of those engaging in building and construction.

Land Commission Rules Against Utah Power and Light Co.

The land commissioner at Washington has sustained the decision of the registrar of the Salt Lake City land office, who rejected the claim of the Utah Power & Light Co. to 423 acres of land in Big Cottonwood canyon. The power company filed on the land as a limestone claim and has used it for water power purposes, the tract embracing the Big Cottonwood creek.

The claim was contested by the United States Forestry Service, as it is within the boundaries of the Wasatch national forest reserve. It was contended by the forestry officials that the property does not contain limestone in commercial quantities.

The power company has thirty days in which to appeal to the Secretary of the Interior. The power company has made extensive improvements on the property for power development purposes.

Work on the Southern California Edison Company's supply station at Alhambra will be started in the near future according to officials of the company. The station, which will cost approximately \$500,000 and cover 21 acres of ground, will furnish supplies to 28 Southern California districts of the company, located in ten counties. More than 300 men will be employed at the station when it is completed.

Los Angeles Refuses to Give Up Kings River Filings

Los Angeles has refused to withdraw its filings for hydroelectric development on the south and middle forks of the Kings River as has been requested by the head of the National Park Service, in order that this territory might be declared the Roosevelt National Park and placed on the same status as Yosemite National Park.

Stephen T. Mather advised the city of Los Angeles that the Southern California Edison Company and the San Joaquin Light and Power Corporation had both withdrawn their requests for water in the section at the request of the Park service. Mr. Mather said, in his telegram to Chief Electrical Engineer Scattergood of the southern city:

"Please consider this an appeal to you to get word at once to N. J. Sinnot, chairman of the Public Lands Committee, withdrawing unqualifiedly the City of Los Angeles' applications for this area and join with the Roosevelt Memorial Association and the millions of admirers of Col. Roosevelt in presenting to the American people a great recreational area free from water-power development in any form. Inasmuch as private interests have renounced all their potential claims, Los Angeles can surely afford to waive a very remote power possibility in favor of another great national park for California."

Special Counsel Matthews of the Board of Public Service Commissioners, declared in his telegram that the city had spent \$40,000 in surveys in this area and was determined to proceed with the development.

Three Utility Initiative Acts to be on California Ballot

Three initiative petitions involving the public utilities of California have been filed in Sacramento, the state capital, recently, according to an announcement by Frank C. Jordan, secretary of state. The first two petitions deal with municipally owned utilities, while the other involves the so-called state water and power development act.

Under the terms of one measure which will appear on the ballot in the 1922 election, municipally owned utilities are to be declared public utilities and the second measure compels them to pay taxes as do all other privately owned utilities in the state. The act declaring municipally owned utilities to be public utilities would place these departments of the city government under the control of the State Railroad Commission.

The third petition involves the measure propounded by the California League of Municipalities which would place all waters of the state under the control of a board of appointees of the governor. This body would be charged with the development of the water resources either for irrigation or power. It also provides for the bonding of the state to the extent of \$500,000,000 to carry on this work.

Factional controversies have developed over the proposed application of Frank G. Baum to use the waters of the upper Salt River for the development of power, on the grounds that such a project threatens to interfere with the Roosevelt Dam and further exploitation of the irrigable lands in that vicinity. Eighteen clubs, towns and irrigation districts appeared before E. C. LaRue at Phoenix on January 3 in an attempt to block the application.

Figures Show Growth of Denver During Year 1921

Intermountain City's Population Increases 20,000, Factories Gain, Public Utility Records Disclose

That Denver has grown both industrially and in population during 1921 has been proven in figures compiled by public utility companies and the Secretary of State. The growth in population for the year is placed at 20,000, giving the city a population of 276,401 at the present time.

Similarly building permits reached the highest level in ten years, with indications that the majority of permits were for the construction of homes.

The growth in population is based upon the following facts: The net gain in the number of telephones was 4160 with 1500 applications on file. The ratio of telephones to population in Denver is one to five, showing an increase in population of over 20,000.

The increase in the number of electric customers of the Denver Gas and Electric Light Company from March 1 to December 1 was 5662. Similarly gas customers increased 836 during the same period.

Water users increased in an even greater ratio.

During 1921, building permits to the number of 5606 were issued with a total

value of \$10,137,025. The value of the new homes constructed is placed at \$4,691,000. It is estimated that between five and eight per cent of this was spent in the electrical equipment. The fact that the number and value of the permits issued has constantly increased month by month since January, 1921, with one or two exceptions, is taken as an indication that the volume of building will increase to greater proportions during the coming year.

The investigation conducted by the department of factory inspection under the direction of the Secretary of State, shows that in seven industries the annual payroll amounts to approximately \$106,000,000 while the number of workers totals 60,565. Sixty-six per cent of the industries of the state are located in Denver and Pueblo. These figures show that there are in the state of Colorado 3025 industrial establishments, producing materials valued at \$316,965,000 annually. These industries represent an invested capital of \$280,000,000.

Denver, as the heart of this district, is the first city in size in the Intermountain district.

Western States to Plead for Reduced Freight Rates

Four western states have joined in appointing a representative to attend the general rate hearing before the Interstate Commerce Commission in Washington and press their claims for reduced rates on the products of the basic industries of the West. Utah, Wyoming, Colorado and Idaho have chosen H. H. Prickett, manager of the state traffic bureau of Utah, to act as special counsel for them at the hearings. At a recent conference between the governors of the four states the following basic commodities were included in the list on which drastic reductions will be asked so that the West may develop its industries: the products of agriculture, of the metalliferous and carboniferous mines, wool, livestock, canned goods, petroleum and petroleum products, fruits and vegetables and the products of the forests.

San Francisco Takes Steps To Protect Foreign Trade

San Francisco steamship and railroad interests have reached an agreement to share equally in absorbing the differential of 15 cents per ton port toll charges on all Oriental freight consigned to points east of the Mississippi river. This move was taken to place San Francisco harbor on an equal footing with those of Los Angeles, Seattle and Portland, which have removed all differential toll charges.

Until last year San Francisco had the lowest dockage charge of any Pacific Coast port, charging fifteen cents per ton against prevailing rates of 25 and 30 cents at other ports.

Shipping men have pointed out that while removing this charge in no manner affects the San Francisco harbor commission or the upkeep of the harbor

equipment, the other Pacific Coast ports will suffer from the loss of this revenue. At the present time it is estimated that in excess of forty-nine per cent of the total value of all trade through Pacific Coast ports passes through San Francisco. The removal of the toll charges by other cities was interpreted as a step to secure some of this commerce.

Forest Service Offers for Sale California Timber Tract

The largest single stand of timber ever to be advertised for sale by the government, has been placed on the market by the San Francisco office of the United States Forest Service. The timber comprises approximately one billion board feet of yellow, Jeffrey, sugar and Lodgepole pine, white and red fir and incense cedar in the Lassen National Forest near Eagle Lake, Lassen county.

The timber, "on the stump," is given a value of \$3,350,000. The purchaser must cut it in a manner that will conserve the young trees and at the same time allow for a complete reforestation by the government. The bidding period on the tract will close April 1, although this date may be extended thirty days to allow prospective purchasers to visit the land.

Wages of employes of fifty foundries of the San Francisco bay district were cut ten per cent on January first and at the same time the American plan was put into effect in an effort to stimulate the metal trades industry. Foundrymen in other sections of the state, who have not been bound by agreements with unions, have been doing much of the work that might have been done in the bay region, according to members of the California Metal Trades Association.

Portland to Have Additional Terminal Facilities

To meet the demands for larger shipping facilities in the inner harbor, the Portland Public Dock Commission at a recent meeting voted to purchase the site of the former plant of the Willamette Iron and Steel Works adjoining municipal terminal No. 1 on the north, for the sum of \$180,000. W. C. Alvord, president of the Portland Holding Co., from which the land will be acquired, has agreed to take Dock Commission bonds drawing five per cent interest at par for the entire amount.

The land to be acquired has a frontage of 293 ft. on the harbor line and extends west to Front Street a distance of 510 ft. The tract is occupied to a large extent by buildings of substantial construction which will be renovated and utilized for storage purposes. Several additional buildings will be erected and a modern slip constructed to accommodate one large vessel. Improvements which the Dock Commission will make to the property now will cost approximately \$90,000.

The development of this tract for municipal terminal purposes will greatly relieve the congestion now at terminals 1 and 4, which recently have been unable to accommodate the vessels desiring to dock.

Pit River Tunnel of P. G. & E. Opened New Year's Eve

Workers in the Pacific Gas and Electric Company's 10,180-ft. tunnel near Fall River Mills on the Pit River project broke through on New Year's eve and the process of cementing the walls has now commenced. Work on the tunnel, which is 13½ ft. high and 11 ft. wide, was started on September 15, 1920. Frank Rolandi, the contractor, will receive \$853,440 for the job.

The tunnel will be cemented six inches thick all around except the bottom, which will be 18 inches thick.

One hundred and twenty-five cars of cement will be used. In order that this cement work may be properly installed, bulkheads will be placed at both ends of the tunnel to cut off the draft of wind which blows through the tunnel with considerable force.

Through this tunnel all the water in Fall River, 1,500 second-feet, will be diverted to the Pit River side of the mountain ridge, where it will drop 454 feet into the turbines of Pit River power house No. 1, and generate 93,000 horsepower of electrical energy.

Oregon Irrigation Congress Discusses Reclamation

Irrigation and reclamation were studied from every angle during the 11th annual session of the Oregon Irrigation Congress which met December 15, 16 and 17 at Pendleton. Leading authorities on irrigation in the West were among the speakers to address the congress on the different phases of irrigation work. Not only were projects actually under way discussed but financing, government methods, laws, supervision and farmers' cooperative plans relative to irrigation and reclamation were dealt with. Many resolutions on various irrigation and reclamation questions were adopted by the congress, among the most important of which was

the endorsement of the McNary-Smith bill now before Congress. This bill provides for financial government aid in bringing under cultivation approximately 20,000,000 acres of agricultural land in the United States through irrigation, drainage or diking.

There are today in the state of Oregon approximately 1,230,000 acres in projects completed or partially completed and it is estimated that there is an additional 1,000,000 acres of land that may be irrigated in addition to large areas of land which may be reclaimed through drainage and diking, and the passage of the McNary-Smith bill would greatly aid the state in financing and developing one of its greatest natural resources.

Denver to Have Largest Electric Sign in Mountain District

Denver's renown as the city of lights will ring still farther in January when the huge new Colorado theater is completed and adds its towering electric sign to the brilliance of the movie district.

Beginning just above the Sixteenth Street entrance to the Colorado, this pillar of light will extend as high as the top of the flagpole on the roof, more than seventy-two feet in all. The sign will spell the name "Colorado," with a Colorado state flag at the top in color, and will carry approximately a 48-kw. load. Each letter in the sign will be five and one-half ft. high and the channels of the letters will be seventeen in. wide; 2,123 lights will be used.

The sign will be the biggest one of pillar type installed in Denver or the entire Rocky Mountain region. It was designed by Allen Spencer of The Denver Gas and Electric Company, which company will also build it and make the installation.

The interior lighting scheme of the theater provides for the use of floodlights composed of primary colors and will be controlled from the projection booth. One main drop will be suspended in the auditorium and will have connection for 8000 watts. The mezzanine and foyer will utilize cove lighting effects entirely. The electrical work is under the direction of J. Fischer, a prominent member of the Denver Electrical Cooperative League.

Oil Production in California in 1921 Leads Nation

California's production record for crude petroleum for the year 1921 leads that of every other oil producing state in the country, according to a statement sent out by R. E. Collom, state oil and gas supervisor, in which he places the production of that state in excess of 114,000,000 barrels, an increase of 8,000,000 barrels over 1920. These figures represent a production which was hampered by a strike of almost two months duration in the fields and a readjustment to the general industrial depression. The statement by the oil and gas supervisor says:

"The maximum monthly production for California, in 1921, was reached during May. The production was 10,450,131 barrels. During May, 42 wells in the Elk Hills produced 1,794,156 barrels of oil, that is, less than ½ of 1% of the oil wells of California produced 17% of its oil."

Books and Bulletins

WINNING THE PUBLIC

by S. M. KENNEDY, vice-president in charge of public relations and business development, Southern California Edison Company. Second edition. 148 pages, 6 by 9 in. Illustrated. Published by the McGraw-Hill Book Company, New York.

The immediate response to Mr. Kennedy's book on public relations by men in the public utility field, and the new developments which have taken place since the book was first written have necessitated a second edition of "Winning the Public," incorporating the more recent ideas on customer good will. So important has become this personal element in business, that it now has a recognized place in almost every company's program, especially in the public service field.

Two new chapters have been added to the second edition. The first, "Transforming Public Opinion," embodies the greater service idea, one of the most recent developments in the public relations program. The last chapter, "Overcomplacency," is a warning to every member of a public utility from the highest official to the elevator boy, on the dangers of an apathetic attitude regarding public relationship.

These new chapters, which deal specifically with just how to institute greater service methods among large bodies of consumers of electricity, when put into practice, make possible the transformation of public opinion from an attitude of distrust to one of confidence and good will, at the same time making possible the attainment of a "closer understanding between the public utility and the public served by it."

Arc welding for repair and reclamation, general applications of arc welding, and arc welding for manufacturing processes are well described and illustrated in Leaflet 1825, just published by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. A story is told of how costs are reduced by the use of arc welding.

The Society for Electrical Development, Inc., of New York, has undertaken a campaign for the spread of propaganda on electrical precautions for the prevention of fires. A special committee is cooperating with the fire departments in many of the large cities in the country to determine the exact origin of all fires which are attributed to electricity in an effort to combat the popular opinion that electricity constitutes a serious fire hazard.

The Puget Sound Power and Light Company, Seattle, recently announced that if any part of its new issue of 8% gold coupon, 5-year notes remains unsold after January 10, 1922, such notes will be withdrawn from the market. In making this announcement, company officials said they have been aware for some time that money rates are decreasing, but that they have permitted this issue to remain on the local market in order that local investors might have every opportunity to obtain high-rate securities while these rates prevail.

Meetings of Interest to Western Men

Denver Manufacturing Interests Plan Regular Meetings

The manufacturing interests holding membership in the Denver Electrical Cooperative League, in order to effect closer coordination in support of the movement, held a special luncheon meeting in that city December 16th. It was the result of a previous meeting held by the manufacturers' representatives on the League's advisory committee and it was their opinion that such gatherings would bring to light valuable ideas which might be injected into the League's program.

H. Alex Hibbard was selected as chairman and his procedure was to call upon all the representatives present for an expression of ideas. Everything from the dealer's problems to the electrical home, which is being built by the League, were discussed. The success of the meeting was reflected in the fact that it was decided to hold similar monthly meetings at the call of S. W. Bishop, executive manager.

National as well as local manufacturers were represented, as shown by the following list of attendants:

H. Alex Hibbard, Alex Hibbard, Inc.; Bert Rowley, J. F. Senior and A. R. Woolley of the Edison Electric Appliance Co.; A. H. Cook, Commercial Switch Board Mfg. Company; R. W. Elliott, Albert Sechrist Mfg. Company; C. B. Hoffa, Pittsburgh Lamp, Brass and Glass Company; R. I. Darrow, B. K. Sweeney Electrical Company; W. T. Wells, Mountain States Machinery Company; T. B. Burniture, National Metal Molding Company; E. P. Kipp, Hazard Mfg. Company; G. O. Hodgson, General Electric Company; J. P. Sprunt, Jr., Westinghouse Electric & Mfg. Company; R. J. Horn, Gillespie-Eden Corp.; L. M. Cargo, Westinghouse Electric & Mfg. Company; and A. F. McCallum, Westinghouse Electric & Mfg. Company.

National N. E. L. A. Convention at Atlantic City May 15-20

The national convention of the National Electric Light Association will be held in Atlantic City May 15-20, according to an announcement made recently by President Bump. In connection with the convention there will be an educational electric exposition in which manufacturers from all parts of the country

will participate. The exposition will include all latest scientific developments in the application of electricity. A national drive for more and better business has been undertaken by the association as the result of a meeting representative of all branches of the electrical industry held in New York recently.

Los Angeles Engineering Bodies Elect Officers for 1922

Two Los Angeles engineering societies have elected officers for the new year recently. The Los Angeles section of the American Society of Civil Engineers will be headed by Ralph J. Reed as chairman. Other officers are: F. D. Howell, first vice-president; W. H. Code, second vice-president; E. R. Bowen, treasurer; F. G. Dessery, secretary, and W. K. Barnard and H. W. Dennis, directors. H. Z. Osborne, Jr., chief engineer of the Los Angeles board of public utilities, has been chosen chairman of the local chapter of the American Association of Engineers. Others elected to office are Hulbert C. Ferry, W. W. Patch, W. D. Armstrong, C. W. Koiner, W. B. Leeds and J. B. Lippincott.

The regular meeting of the advisory committee of the California Electrical Cooperative Campaign will be held at Del Monte on January 25, in conjunction with the quarterly meeting of the Pacific Coast Division of the Electrical Supply Jobbers' Association which will convene at Del Monte January 25-28.

Pacific Coast electrical interests are mobilizing for an attempt to bring the next annual convention of the Lighting Fixture Manufacturers' Association and the Lighting Fixture Dealers' Society of America to the Pacific Coast. The two organizations will meet for the 1922 convention at Milwaukee on January 30. At that time Pacific Coast delegates will put forward the proposition of holding the next meeting in either Los Angeles or San Francisco.

Idaho Organizations Will Hold Joint Convention

The joint convention of the Idaho Society of Architects, the Idaho chapter of the American Association of Engineers and the Idaho Irrigation Congress will be held in Rupert, Idaho, January 16 to 21, inclusive.

"As these three branches of engineering are mutually interested in the growth of the industry, the practice of holding their conventions together has gone a long way towards bringing about a coordination of operations necessary to the rapid development of the natural resources of the country," said T. W. Halliday, chairman of the program committee.

During the week's program about twenty-five speakers from different parts of the country will appear. Their topics will be announced later. As a special feature, a manufacturer's exhibit of engineering specialties and equipment is being arranged for.

Corporation Increases Sales in British Columbia

Cooperation in the electrical industry made possible the recent very successful campaign for Christmas business for the electrical dealers in British Columbia. Through the Electrical Service League of British Columbia the industry conducted an advertising campaign lasting approximately six weeks, promoting the electrical appliance as a Christmas gift.

About the middle of November, attractive window cards were published showing the actual cost of operation of various appliances. These were used in window displays of the various appliances listed. Following this, streamers in red and green colors were displayed by all the dealers in the province, carrying the slogan, "Say Merry Christmas Electrically."

Beginning December 16, continuing until December 22, the daily papers carried large advertisements prepared by the League. This advertising ran for three days in Vancouver, four days in New Westminster, and three days in Victoria, and produced excellent results.

The dealers in British Columbia all report a splendid Christmas business, in many cases a very considerable increase over the same period last year.

The January meeting of the California State Association of Electrical Contractors and Dealers will be held in Sacramento on January 21. Members from San Francisco and Oakland are planning an excursion in connection with the meeting on the river steamer, "Pride of the River" which has been chartered for the excursion. The delegates will leave San Francisco Friday evening, January 20, and will arrive in Sacramento the next morning.

For the first time in the history of Wisconsin the tax commissioners of that state are to levy an impost on a municipal utility, the electric plant of Stoughton having made itself amenable to state taxation by extending its service outside of the city. Stoughton will be forced to apply to the Public Service Commission for permission to increase its rates to meet the tax.

COMING EVENTS

WESTERN ASSOCIATION OF ELECTRICAL INSPECTORS

Annual Meeting—Chicago—January 17, 18, 19, 1922

PACIFIC COAST DIVISION, ELECTRICAL SUPPLY JOBBERS ASS'N

Quarterly Meeting—Del Monte, Cal.—January 25-28, 1922

LIGHTING FIXTURE DEALERS' SOCIETY OF AMERICA

Annual Meeting—Milwaukee—January 30-February 2, 1922

NATIONAL ELECTRIC LIGHT ASSOCIATION

Annual Convention—Atlantic City—May 15-20, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Riverside, Cal.—April, 1922

IDAHO IRRIGATION CONGRESS, SOCIETY OF ARCHITECTS AND IDAHO CHAPTER, A. A. E.

Joint Convention—Rupert, Idaho—January 16-20, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

Wilbur E. Coman, vice-president and general manager of the Washington Water Power Company of Spokane, recently resigned from that post to become western traffic manager for the Northern Pacific Railway with headquarters in Seattle. Connected for many years with various railroads, Mr. Coman became associated with the power company two years ago. He has



W. E. COMAN

been one of the most active workers in the electrical industry in the Northwest during his association with it. His first position with the railroads was when a youth with the Oregon-Washington Railway and Navigation Company. In 1909 he became general freight and traffic agent of the Spokane, Portland and Seattle Railway, a position he held until 1914 when he resigned to become vice-president and general manager of the Northwestern Electric Company of Portland.

Robert W. A. Brewer, consulting mechanical engineer, well known on the Pacific Coast in connection with his supervision over the manufacture of wireless apparatus for the British Government during the war, has been awarded the Bessemer Premium by the Society of Engineers, of London, for his work in the development of radio equipment while stationed in San Francisco. This is the second time Mr. Brewer has received this honor, the premium having been presented to him ten years ago for his work in connection with two-cycle engines.

William M. White, engineer for the Allis-Chalmers Manufacturing Company, who just returned to the United States from the Orient, forsook engineering for exploring while visiting the mountainous district of the island of Formosa. Mr. White was the fourth white man to enter this district and the first to photograph the savage head-hunters with whom the Japanese are having such trouble.

A. E. Holloway, superintendent of the Commercial Department of the San Diego Consolidated Gas and Electric Company, has been elected president of the San Diego Electric Club.

H. C. George, oil recovery engineer of the San Francisco office of the U. S. Bureau of Mines, has returned to his office after an extended trip through the mid-continent and eastern oil fields, gathering data for the preparation of a booklet on "Surface Equipment for Oil Well Pumping."

Personals

Louis Glass, president of the Manila Telephone and Telegraph Company, arrived in San Francisco from the Philippines recently en route to the East on a business and pleasure trip.

Ralph R. Woolley, hydraulic engineer with the United States Geological Survey, has been appointed head of a body to make a complete water survey of the Uintah basin country in Utah. He will be assisted by C. C. Jacobs, engineer for the Provo Reservoir Company.

M. J. Gavin, in charge of the U. S. Bureau of Mines oil shale investigations at Boulder, Colo., spent the greater part of the month of December at the San Francisco office of the Bureau.

Dr. Robert A. Millikan, director of the Norman Bridge Laboratory at the California Institute of Technology, has returned to Pasadena with Professor H. A. Lorentz, of Haarlem, Holland, world-famous mathematical physicist, who will deliver a series of lectures at the institute during the winter quarter. While in the East Dr. Millikan inspected the million-volt transformer which is to be installed on the institute campus by the Southern California Edison Company for test purposes.

General George Goethals, builder of the Panama Canal, is reported to have been retained to investigate and report on the feasibility of the proposed \$320,000,000 Columbia Basin irrigation development.

W. H. Phelps, assistant division engineer for the Southern Pacific Company, has been chosen to head the delegation from the local section of the American Association of Engineers to the San Francisco Engineering Council. The other members are Captain A. J. Capron and D. L. Reynolds.

J. C. McPherson, former superintendent of the electric division of the Southern Pacific Company in Oakland, Alameda and Berkeley, has returned to his former post after two years as general superintendent of the Pacific Electric Railway in Los Angeles. During the war Mr. McPherson served as a captain of the engineers overseas. His new title is superintendent of the East Bay Electric Division.

Clare N. Stannard, secretary of the Denver Gas and Electric Light Company, has been appointed a member of the Denver Tourist Bureau for the present year. Ben F. Read, of the Mountain States Telephone and Telegraph Company, and E. S. Kassler of the Nevada-California Electric Corporation were also appointed members of the board.

Major Harry Kluegel, San Francisco engineer, has been appointed chief of the Division of Water Rights of the California Department of Public Works to succeed Captain Charles H. Lee. Major Kluegel was formerly chief engineer for the Mt. Whitney Power and Electric Company and the Yosemite Power Company. Later he was in charge of the water supply investigations for Denver, Colo. During the war he held important positions of an engineering nature in the quartermaster's department.

E. B. Criddle, general agent, Southern Sierras Power Company heads the Rate Research Committee of the Pacific Coast Electrical Association, affiliated with the N. E. L. A. Other members of the committee are A. W. Childs, superintendent of sales, and I. H. Lecklider, assistant to the mechanical and electrical engineer, Southern California Edison Company; F. C. Piatt, electrical engineer valuation department, Pacific Gas and Electric Company; J. B. Black, general sales manager, and H. F. Jackson, general manager, Great Western Power Company; M. E. Newlin, manager, Fresno district, and Lloyd Henley, statistician, San Joaquin Light and Power Corporation; and A. E. Holloway, superintendent of the commercial department, San Diego Consolidated Gas and Electric Company.

George J. Eberle, consulting economist and statistician and professor of public utilities and statistics at the University of Southern California, has opened an office in Los Angeles for the purpose of conducting investigations of the financial conditions of public utilities and industries on the Pacific Coast. He was retained by the British Columbia Railway Company, to appraise its properties for determining the assets for rate making.

H. H. Jones, general manager of the San Diego Consolidated Gas and Electric Company, has been appointed one of the five trustees of the San Diego Chamber of Commerce, who are charged with making a drive for the purchase of 1000 acres of industrial land adjacent to that city's harbor. The announcement that Mr. Jones will take part in this activity indicates that the men of the electrical industry are thoroughly cognizant of the industrial future of the West and are cooperating in the promotion of industrial enterprises. Mr. Jones



H. H. JONES

is a graduate of Lehigh University, and a veteran of the Spanish-American war. For several years he was connected with various eastern railroads and came West to take part in the construction of the Denver Tramway Company's power plant. He entered the H. M. Byllesby organization in 1909 as manager of the Northern Idaho and Montana Power Company. After one year in this position he was transferred to the position he now holds. Mr. Jones is an active participant in the civic and commercial welfare of San Diego and was a vice-president and director of the Panama-California Exposition.

Viscount Eiichi Shibusawa, one of Japan's foremost financiers and director of several of the largest power companies in Nippon, has been in California studying Japanese immigration in that state. The survey is being made with a view to promoting cordial relations between the two nations.

S. L. Naphali, former general manager of the Great Western Power Company, has again become connected with that company, a detailed announcement of which will appear at a later date.

H. W. Turner, pioneer in the electrical industry in the West, has retired from active participation in matters electrical, to Carmel-by-the-Sea. For many years "Daddy Harry Turner," as he is affectionately known, was general manager of the Montana Power Company, and is at present the owner of the Montana Electric Company of Butte and the Washington Electric Supply Company of Spokane.

C. G. Gauntlett, Pacific Coast manager for the Safety Insulated Wire & Cable Company, with headquarters at San Francisco, has just returned from a visit to Scotland where he has been studying the business and commercial recovery of European markets, in addition to enjoying a well earned vacation.

Dr. Frank B. Jewett, chief engineer of the Western Electric Company, is being proposed for president of the A. I. E. E., to be voted on by the membership during the spring of this year. Mr. Jewett is a native of Pasadena, California, and graduated from the Throop Institute of that city in 1898. He took his doctor's degree at the University of Chicago in 1902, after which



DR. F. B. JEWETT

he became research assistant to Prof. A. A. Michelson at the University of Chicago. During the war Dr. Jewett rendered eminent service in the research department of the Signal Corps, with the title of Lieut. Colonel. It will be recalled that four years ago Dr. Jewett was nominated for the office of president of the Institute, but declined to accept it on account of ill health. His health has since been fully restored and it is with a great deal of interest that western men are looking toward his nomination to this important office.

F. S. Henderson, manager of the Western Light and Power Company at Boulder, Colorado, is building a bungalow for himself which will be completely equipped electrically and which will serve at the first home electrical in that community.

Dexter S. Kimball, recently installed president of the American Society of Mechanical Engineers, contemplates a visit to western engineering centers during June of the current year. Mr. Kimball will visit practically all of the western society sections at that time and his visit is being looked forward to with a great deal of interest in the West, as it will be recalled that Mr. Kimball worked for many years at the Union Iron Works in San Francisco and later graduated from Stanford University.

Major-General William Murray Black, former chief engineer for the U. S. Army, has returned to the United States after two months spent in China making a survey for the \$14,000,000 harbor improvements contemplated at Shanghai. General Black was called from the retired list to represent this country on the board of engineers charged with the work. He is well known on the Pacific Coast from his activities in various developments coming under the jurisdiction of the army engineers.

F. E. Johnson, sales manager of the M. W. Kellogg Company, manufacturers of welded pipes and specialties, is now visiting metropolitan centers of Japan and India.

W. R. Putnam, vice-president and general manager of the Idaho Power Company, as president of the Northwest Electric Light and Power Association, attended the December meeting of the Executive Committee of the N. E. L. A. in New York City. Mr. Putnam gave an interesting description of the work of his association in the Northwest and described in detail the recent snow storm that banked up a pile of snow and ice seventy feet in height along the Columbia Highway near Multnomah Falls.

Herbert Fleishhacker, vice-president of the Great Western Power Company; Wallace Alexander, president, and Robert Newton Lynch, manager of the San Francisco Chamber of Commerce; J. C. Clarke, associate professor of electrical engineering at Stanford University; E. A. Wallis, Pacific Coast manager of the Western Electric Company; and Robert Sibley, editor of the Journal of Electricity and Western Industry, are among those who have just returned to San Francisco after extended business visits in eastern centers.

P. M. Parry, commercial manager of the Utah Power and Light Company, has been elected chairman of the advisory committee of the Rocky Mountain Electrical Cooperative League for the new year. As a representative of the central station on the committee since the inception of the league a year ago, Mr. Parry thoroughly understands its workings and the year ahead promises to be a most properous one for the organization under his leadership. An ardent believer in the doctrine of co-operation among the men of the industry, he has directed the cooperative efforts of the power company among the dealers in the Intermountain district. The other officers of the advisory committee who will work with Mr. Parry are Vice-President J. A. Kahn, president of the Capital Electric Company of Salt Lake City, and Secretary-Treasurer R. M. Bleak, superintendent of lighting and appliance sales, Utah Power and Light Company.

Henry M. Shaw, president of the Atlantic-Pacific Radio Supplies Company, has recently completed the installation of one of the most powerful radio broadcasting stations on the Pacific Coast in his home in the Rock Ridge section of Oakland. Mr. Shaw was



H. M. SHAW

chosen by the war department to assist in the development of radio equipment for England and America during the war, he came to San Francisco and became connected with the Moorhead Laboratories. He has had a substantial part in giving the West this radio enterprise.

H. Alex Hibbard, prominent Denver manufacturer's representative, is a member of the committee responsible for the equipment to be placed in the first electrical home now being built by the Electrical Cooperative League of that city.

D. W. Boylan, Pacific Coast manager of Johns-Manville Company; T. E. Bibbins, president of the Pacific States Electric Company; J. D. Barnhill, of the advertising firm of Evans & Barnhill, are among those who are absent from their San Francisco headquarters and are visiting in eastern business centers.

W. F. Durand, professor of mechanical engineering at Stanford University, has left for a visit to European centers, to be gone for several months.

Obituary

William O. Fouch, president of the Western Electric Works of Portland and one of the foremost men in the electrical industry in Oregon, died recently. He was affectionately known among the electrical men as the founder of the electrical contracting business in Portland. He came to the Northwest in 1888 from Illinois and immediately started a contracting business. The present manufacturing business was started in 1891. He was instrumental in organizing the first Oregon electrical contractor-dealers' association and on two different occasions served as president. He was president of the Manufacturers' and Merchants' Association of Oregon at the time of his death. His loss will be keenly felt by his associates and the electrical industry.

The Flint Electric Company of Denver has become a member of the Electrical Cooperative League of that city.

The service department of the Westinghouse Company for the entire Rocky Mountain region has been placed under the direction of A. F. McCallum of Denver.

The Morganite Brush Company, Inc., New York, announces that its agency in southern California, formerly held by Charles W. Farnham, has been concluded and that it is at present being represented in that territory by the Special Service Sales Company, 502 Delta Building, Los Angeles.

Thor products have received additional representation in Denver in the opening of a stall in a prominent south side market by the Baker Electric Company, which concern is featuring home laundry equipment.

The Sechrist Manufacturing Company of Denver, one of the largest fixture manufacturing concerns in the Rocky Mountain region, has patented and is now producing an electric pressure cooker with a three-heat element.

The Colorado Electric Machine Company of Denver has been taken over by the firm of Nollenberger and Dörner, prominent contractor-dealers of that city.

Wm. E. Gunther of Denver has taken charge of the Universal appliances for the New England Electric Co., jobbers in that territory.

Scott Bros. Electric Company of Denver has installed an automatic dimmer for the control of the new lighting system in their display window which has as a feature a variety of color screens mounted on X-Ray reflectors concealed behind a valance on the window glass.

The 1900 Washer Company, through its representative, George Williams, has taken membership in the Denver Electrical Cooperative League.

J. A. Rockwood, valuation engineer of the Portland Light and Power Company, has returned from a business trip to the national capital at Washington, D. C.

The Mine and Smelter Supply Company, prominent Denver jobbers, held its annual salesmen's convention in that city during the last week of December. Thirty-five salesmen and a number of eastern manufacturers' representatives were present.

The Mountain Electric Company, Denver jobbers for the Edison Electric Appliance Company, has installed a new wall show case for the display of hollow-ware and small heating appliances.

Hendrie and Bolthoff, one of Denver's largest jobbers, gave a New Year's dinner to its 280 employees. Speakers of the evening included E. B. Hendrie and H. P. Waterman, officers of the company. It was announced that the H and B summer house for employes at Buffalo, Colo., would be doubled in capacity by June.

C. E. Silsbaugh Company, Caldwell, Idaho, has inaugurated a selling contest among school children in connection with a newly installed line of electrical appliances of all kinds.

S. H. Lanyon, San Francisco sales engineer, has been appointed Pacific Coast manager for the Okonite Company, Passiac, N. J., manufacturers of insulated wire, cable and tape.

Manufacturer, Dealer, and Jobber Activities

R. S. Willoughby, dean of Denver electrical contractors, has secured patents on a new aluminum pressure cooker which will later include electrical heating apparatus. His company is known as the Three-in-One Pressure Cooker Company and a small factory has been opened at 335 West Colfax Avenue. As soon as representatives have been secured for every state, production of the cookers on a large scale will be made, the company announces.

The Habirshaw Electric Cable Company, Yonkers, N. Y., in a recent issue of "The Wire Message," the company's monthly publication, explains the appointment of receivers in equity for the concern. The announcement, the statement explains, is merely a step in the reorganization of the company, and in no way affects the business or future progress of the company.

The Hubbard Machine Company, San Francisco, manufacturers of well pumps and machinery for testing crude oil, has developed a new unit which incorporates a double-acting cylinder, designed to give a continuous flow of water as well as a higher volumetric efficiency than the ordinary type. A second feature is a newly developed power head which converts rotary motion into a reciprocating one. Tests are being made on a unit which has been installed for the Pacific Gas and Electric Company.

The Lapp Insulator Company, Inc., Le Roy, N. Y., has announced its representatives for the Pacific Coast and far western territory. S. H. Layton, 507 New Call Building, San Francisco, will handle the company's material for the Pacific Coast territory. Utah, eastern Nevada, southern Idaho, and western Montana will be covered by the Capital Electric Company, Salt Lake City, while the Butte Electric Supply Company will handle the Montana territory.

The San Francisco offices of the Crocker-Wheeler Company, Ampere, N. J., manufacturers of motors, have been moved from the Crossley Building to the Atlas Building.

The Veteran Electric Company, Vancouver, B. C., recently won the distinction of having the best decorated window in British Columbia, in connection with the Armistice Day celebration. The window urged the purchase of memorial poppies, the funds from which were devoted to the aid of war sufferers. A feature of the display was that all of the members of the firm are returned war veterans.

The Ajax Specialty Company, St. Louis, Mo., has appointed the Barnett Sales Company, Lumbermen's Building, Portland, as its representative in the Pacific Northwest. The Electric Agencies, of San Francisco has been appointed California representative for the company.

The Western Agencies Company, of San Francisco, recently gave a banquet at the States Restaurant to all members of the sales force for America vacuum cleaners. Arthur C. Maryon acted as toastmaster.

The Wagner Electric Manufacturing Company, St. Louis, Mo., has placed on the market a new polyphase motor under the trade name of "Pow-R-full." The design incorporates suggestions from motor users and suggestions from engineers gathered during the last ten years. The motor is described in bulletin No. 129.

The Wells Morris Manufacturing Company, San Francisco, has moved into its new factory in Folsom street. G. F. Wells, manager of the concern, is optimistic regarding the industrial future of San Francisco, and states that with enlarged quarters and new equipment, the concern will be in a better position to cope with the increasing industrial demands.

The Ward Leonard Electric Company, Mt. Vernon, N. Y., has issued section A-3, describing its automatic motor starter, and section D, describing its Vitrohm field rheostats, both to be added to the regular catalog.

The P. A. Geier Company of Cleveland, Ohio, has issued a pamphlet, "How to Secure a Prospect List," which enumerates for the benefit of dealers and salesmen 31 tested ways of finding prospective buyers for household appliances. The booklet is a boiling down of trade paper suggestions and salesman and jobber experience.

The Holophane Glass Company, Inc., New York, has perfected the Holophane lightmeter, an accurate, portable instrument designed for the measurement of foot-candles, and other units of illumination. The instrument is described in bulletin No. 343, which is ready for distribution.



COOPERATIVE CONVERSATION

Robert L. Eltringham, manager of the California Electrical Cooperative Campaign, is pointing at something mutually agreeable to Albert H. Elliot, secretary of the Pacific Coast Division of the Electrical Supply Jobbers' Association. In fact the "golden-tongued" Mr. Elliot seems spell-bound at the sight and is letting "Bob" do all of the talking. If we had three guesses as to the topic of the conversation and the reason for the smiles, we should say, "Lady. Lady. Lady."

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting
Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

BUILDING PERMITS AND BANK CLEARINGS FOR DECEMBER IN 7 WESTERN CITIES

	No. of Permits	Value	Bank Clearings
San Francisco	568	\$2,700,705	\$613,500,000
Los Angeles	3,364	9,168,851	407,624,000
Spokane	115	88,225	44,878,000
Seattle	518	494,835	142,149,000
Portland	731	845,055	130,244,000
Salt Lake City.....	117	404,595	69,572,000
Denver	243	713,200	130,174,000

SAN FRANCISCO

Building activities increased noticeably during November and December and the year closes with a strong undercurrent of optimism, noticeably absent during the latter half of the year. Wholesale lumbermen report a stronger demand for materials with firmer prices.

Demand for lumber showed a marked increase over other months of the year, and price advances were generally maintained. The reasons for increased activity were greater demand on the part of all wood working crafts, larger buying of car material for repairing and new rolling stock, laying in stocks on the part of many lumber yards, and export shipments, especially to Japan. Resumption of activity on the part of California and northern California mills resulted in measurably decreasing unemployment in the large centers of the Pacific Coast.

Savings banks report increasing deposits following the withdrawals during the building trade wage readjustment.

SEATTLE

Lumber business in sight from railroads, large eastern industrial centers, and the Orient, is sufficient to call for full producing strength for the sawmills and logging camps of the Northwest during the coming year. At present, orders are exceeding actual production in all points of the Northwest, and the lumber stocks in the various yards are rapidly being depleted.

As a result of a revival in Oriental trade, the backbone of Seattle's foreign commerce, 29 ocean steamships will sail from Elliott Bay for the far East during January, as compared with 12 steamships in January, 1921.

Washington's wheat crop this year totaled 51,200,000 bushels, according to estimates made by the State Department of Agriculture following reports from licensed warehouses throughout the state. The Yakima and Wenatchee valleys, and other fruit-raising sections east of the Cascades also report a highly satisfactory and profitable year of production.

The unemployment situation, due to the reopening of camps and mills, and allied industries, is gradually showing improvement.

LOS ANGELES

With the returns for building permits in December, shown above, the total for the year in this city reached 37,206 permits, involving an expenditure of \$82,761,000. This is an increase of approximately 300 per cent over 1919.

Rainfall throughout this section is now above the average for the last six years. This is looked upon as being of inestimable value to the farmers and fruit growers. The damage as a result of a heavy downpour during the holidays was not serious except in a few limited sections.

Electrical jobbers and dealers find in closing their books for the past year that they have handled a larger volume of goods at 25 to 30 per cent lower inventory value than were sold during 1920, and in many instances the actual cash sales exceed the figures of the previous year. The last few months were far better than the earlier part of the year and this gives much encouragement to the trade. All agree that the business is to be had but the sales competition is much more strenuous than in 1920.

PORTLAND

Portland enters 1922 with bright prospects for a prosperous year. The worst of the depression is over and there is a feeling of optimism on all hands. A fine building record was established, postal receipts passed the two million dollar mark, being the highest in the history of the city, and export business showed a gain of approximately 6 per cent, which although small is nevertheless quite significant because of the fact that Portland, according to report, is the only Pacific Coast port to show a gain in export business during 1921. Although the lumber industry is a little quiet at the present time and will remain so for 30 to 60 days, the outlook for a rapid recovery to normal is exceedingly bright. A number of large orders have either been placed or are in sight and mills which have been shut down for a year or more are planning to resume operations.

Volume of Christmas business in all lines is reported as very satisfactory and in the electrical business many jobbers and retail stores report this year's business in excess of that of last year.

Because of the large amount of building, electrical contracting business during the last half of 1921 was very active and it is predicted that it will be still more active throughout the ensuing year.

SALT LAKE CITY

General indications in the intermountain section point to improved business conditions. The distribution and circulation of the war finance corporation allotments to the sheep, cattle and sugar beet raisers have materially helped the situation, particularly in the agricultural districts. The banks report conditions rather quiet, with not much demand for new loans, but many requests for renewal of notes. The unemployment situation remains practically unchanged. Holiday trade among the retail dealers was fairly satisfactory, although at the present time the usual seasonal slump is in effect. Collections are reported as fair.

DENVER

Christmas buying in all lines was about 25 per cent under the 1920 records and while the department stores showed a falling-off of 30 to 40 per cent, reports from electrical jobbers and dealers indicate an average decrease of not over 15 per cent. Sharp reductions in clothing and annual clearance sales stimulated buying immediately after the holidays with a period following in which goods moved slowly.

Unemployment is increasing and it is not impossible that building wages will be reduced shortly. A mild winter thus far fortunately has kept building construction up and unemployment down. On the other hand, it has resulted in the closing down of a number of coal mines because of the lack of orders.

Loans of all natures are hard to obtain and with collections slowing up, credit is limited. Few failures are being reported and representative bankers feel that conditions will improve.

SPOKANE

A more optimistic outlook in business and agricultural circles is apparent in the first days of 1922. This is due in large measure to the improved business conditions which have obtained in the last three months. In this period, lumber, dormant during the entire nine months preceding, showed activity, an immense apple crop was harvested and the proceeds of a good wheat crop was sold. Lumbermen now look forward to a considerably increased business this year. The mining men of the Coeur D'Alene silver lead district look for renewed activity during 1922, basing their hope on the fact that Butte, where copper is the chief metal mined, has resumed operations.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

MARSHFIELD, ORE.—The North Bend Mill & Lumber Co. plant was opened on Jan. 10. The plant will employ over 100 men.

SEATTLE, WASH.—The county commissioners announce that they are ready to appropriate \$50,000 for flood-damaged roads and bridges.

CHEHALIS, WASH.—The city commission recently adopted a resolution providing for a standard street lighting system, which will include the principal business streets of the city.

EUGENE, ORE.—This city has filed an application with State Engineer Percy Cupper for 2500 sec.-ft. of water from the McKenzie river in Lane county for municipal power development.

YAKIMA, WASH.—Burnet & Deming of Seattle were the lowest bidders on the general irrigation system contracts bids recently opened by the city commission. Their figure was \$181,877.50.

OLYMPIA, WASH.—Articles of incorporation have been filed by the Northwest Storage Battery Co., Spokane, through John A. Peacock. The incorporators are H. W. Brow, V. L. Rinehart and E. W. Douglas.

SPOKANE, WASH.—Permission to build a bridge across Snake river at Central Ferry was granted recently by a bill passed by Congress. The bridge is to cost \$300,000 and will be a joint state and federal project.

WINLOCK, WASH.—The Cowlitz Mission Electric Company has been incorporated here by Joseph Sommers, Andrew Rusher, Henry Stendenbach, et al. The new company plans to engage in the general lighting and power business.

WHITE SALMON, WASH.—The factory of the Laurel Box Co. was recently destroyed by fire, involving a loss of \$20,000 to boxes and lumber and \$25,000 to the plant. Harrison & Huft, the owners, are planning to rebuild in the spring.

BREMERTON, WASH.—Morgan & Co. of Tacoma were awarded the contract for the entire construction of the section of the Navy Yard highway from Charleston to the head of the bay, which includes the building of two concrete bridges. Their figure was \$79,000.

AUBURN, WASH.—The cost of repairing flood damages is estimated at \$91,700 by the county engineer. Bridge repair work in the northern district will require \$29,000, that in the southern district \$11,000, while the remainder will be required for highway repair.

BELLINGHAM, WASH.—The Bloedel-Donovan Lumber Company is considering the proposition of building 20 miles of railroad on the Olympic Peninsula for the transportation of logs from its timber holdings to tidewater. The company has 700,000,000 feet of timber in this area.

CHEHALIS, WASH.—The Coy Valve Co. is planning the erection of a large plant for the manufacture of small machinery equipment. W. Graham, manager of the plant, recently sold his factory, the Graham Valve Works, in Indiana. Construction work is to start in about 60 days.

PORTLAND, ORE.—Bids are being asked for the construction of the Bridge of the Gods, to be located on the site of the mythical bridge at Cascade Locks, according to Dorr E. Keasey, who has organized a corporation to start the

project. The bridge will be 1500 ft. in length, with a main span of 705 ft. Plans have been drawn by R. R. Clark. The cost is estimated at \$450,000.

SALEM, ORE.—James Lindsey, 438 Worcester Bldg., Portland, has filed an application with State Engineer Percy Cupper for 70,000 acre-ft. storage in Marion Lake behind a dam 100 ft. high. The water is to be used for power and irrigation purposes. The project will cost \$225,000.

TACOMA, WASH.—Plans have been completed for the construction of a three-story and basement apartment house building to be erected by Charles L. Epps at North Third Street and Yakima Avenue, at an estimated cost of \$30,000. Plans have been prepared by Dutton, Whitney & Duggan of Tacoma.

TACOMA, WASH.—At an approximate cost of \$250,000, the Tacoma Ice and Refrigerating Company will erect in Tacoma a modern cold storage and ice-making plant at South 26th and Holgate streets. The proposed plant will be five stories and basement of heavy concrete construction, faced with red brick exterior walls and terra cotta trim.

SEATTLE, WASH.—Martin Beck, president of the Orpheum vaudeville circuit, has announced that his company will immediately build a new theater in Seattle to cost between \$750,000 and \$1,000,000. He also stated that a new Junior Orpheum will be built in Portland at a cost of \$1,000,000. Work on both theaters is to start in the spring.

SEATTLE, WASH.—The city utilities commission has drafted an ordinance for the appropriation of \$25,000 to install 170 incandescent and 40 arc lights in various parts of the city. This is the first street light extension to be made by the city since 1917. The city proposes to sell \$1,050,000 of a previous light bond issue to cover extensions to be made during 1922.

OLYMPIA, WASH.—Contracts for the Lincoln School building have been signed and awarded as follows: Western Construction Co., Seattle, general contract; Norton & Sangler of Seattle, heating and ventilating; Rushlight & Hasdorf of Portland, plumbing; A. J. Agutter & Co. of Seattle, electrical wiring. Work has already been started by the general contractors.

THE PACIFIC CENTRAL DISTRICT

NAPA, CAL.—The Union Ice Co. is about to start building and equipping a fireproof ice plant to cost approximately \$50,000.

SAN LEANDRO, CAL.—M. S. Gaulart will erect a creamery and ice cream plant here for the Hayward Ice Cream Co., in the near future.

SAN FRANCISCO, CAL.—The Italian-American Bank is contemplating the erection of a bank building at the southeast corner of Columbus Ave. and Broadway.

MOUNTAIN VIEW, CAL.—Arrangements have been made for the erection of a \$40,000 factory to be called the Growers' Ice and Cold Storage plant of Mountain View.

SHAFTER, CAL.—The Di Giorgio fruit ranch near Arvin is contemplating a vineyard project which will necessitate the spending of approximately \$2,000,000. Stroud Brothers of Bakersfield has been awarded the contract for 125,000 ft. of pipe.

FORT BRAGG, CAL.—Ukiah citizens approved a \$64,000 bond issue at a recent election for the purchase of the water works of the Ukiah Water and Improvement Co.

WOODLAKE, CAL.—The Western Citrus Honey Corp. is engaged in erecting buildings to consist of a plant shop and warehouses, bunk houses, dining hall, kitchen and garages.

WHEATLAND, CAL.—The California Hemp Industries has purchased 7000 acres of land near here for the building of a city to be known as Hemp. They will also build a \$50,000 factory for the extraction of hemp fiber.

PETALUMA, CAL.—The Chamber of Commerce has recently received a telegram from Webster & Crafts, of Massachusetts, accepting a proposition relative to opening a shoe factory building here in the near future.

SANTA ROSA, CAL.—Grace Bros. have plans and specifications ready for enlarging their ice and refrigerating plant. The addition will be constructed of reinforced concrete and will be 60 ft. by 76 ft., three stories high.

SAN FRANCISCO, CAL.—A steel mill will be built in California provided hydroelectric power developments in the near future assure a definite supply of power, according to an announcement made by H. W. Hunsicker of the Sizer Steel Company of Buffalo.

HANFORD, CAL.—Articles of incorporation of the Island Ice Company have been filed at Sacramento. J. Croolman, J. McDowell, J. Madson, and R. Hamlin are the directors. The company will erect a modern cold storage and ice plant in the near future.

SAN FRANCISCO, CAL.—Plans for a one-story reinforced concrete auto repair and welding plant have been completed by H. Shermund, architect, Hearst Building. The building will be erected near the Chevrolet plant in Oakland and will cost approximately \$18,000.

SAN FRANCISCO, CAL.—Preliminary plans are being prepared by Maury L. Diggs, Easton Bldg., Oakland, for new cannery buildings for the H. G. Prince Company. The building will be erected at the present plant on E. 11th and 29th Ave. in Oakland and will cost \$100,000 or more.

FRESNO, CAL.—B. G. McDougal, architect, of San Francisco, is preparing the plans for the 10-story hotel to be erected for F. M. Williams and Fred Todd on Tulare street. The structure will be reinforced concrete and is to contain 300 rooms. The cost is estimated at \$500,000.

FRESNO, CAL.—Plans for a new cannery for the Sears and Nichols Cannery Company of Chillicothe, Ohio, have been completed, according to an announcement made by W. H. Sears, president of the company. When the Fresno cannery is in operation, other plants will be located at a city in the Sacramento valley and one in the Santa Clara valley. The company operates 18 canneries in the East.

THE INTERMOUNTAIN DISTRICT

YUMA, COLO.—A new Presbyterian church will be built here at a cost of \$75,000.

LAS VEGAS, NEV.—The West End Chemical Co., owner of the colemanite or borax ore located near Las Vegas, will soon start work on a mill.

BRUSH, COLO.—The city council has approved plans for paving the main streets at a cost not to exceed \$150,000.

BRIGHTON, COLO.—Another state armory is a reality in the breaking ground here for a new \$35,000 building which will be constructed of hydro-stone, a local product.

CHEYENNE, COLO.—A five-story building will be constructed at Seventeenth and Capitol streets by Paul H. Moore and associates for business purposes, the cost of which will be over \$200,000.

DENVER, COLO.—A new hundred thousand dollar addition for contagious and orthopedic cases will be made immediately to the Children's Hospital through the generosity of Mrs. H. H. Tammen, wife of one of the proprietors of the Denver Post.

DENVER, COLO.—A fifty-apartment building three stories high and costing in excess of \$100,000 will be built immediately by Bernard Desjardines of 1777 York St. Permit for the construction at Ninth and Sherman Streets has already been given by the city.

CASTLE ROCK, COLO.—Plans are being made by the city council for the installation of a small municipal lighting system. Should they not be perfected, it is reported that lines from one of the prominent Colorado power companies will be extended to this place to provide lighting.

DENVER, COLO.—Another uptown building will be that of the L. R. Steel Stores Company at 16th and Welton Street, which will be started immediately by the C. S. Lambie Construction Company of this city. When equipped, it is estimated the property will cost approximately \$400,000.

SALT LAKE CITY, UTAH.—The town of Junction has filed an application with the state engineer's office for the use of five sec.-ft. of water from City Creek in Piute county to be used in the development of municipal power for Junction and Circleville. The plans contemplate carrying the water through a three-ft. wheel with a head of 1100 ft. for developing 530 hp.

DENVER, COLO.—The Harding, Zook and Bahl Engine Corporation, whose offices are in the First National Bank Bldg., have announced the purchase of a site where they will erect a factory for the production of commercial airplanes. It is intended to have a plant with a capacity of 100 machines for 1922, which will be enlarged later. A. D. Zook is secretary of the company.

SALT LAKE CITY, UTAH.—The Dixie Power Company, through W. W. Vannon, engineer, has filed an application for 15 sec.-ft. of water from Coal Creek in Iron county for the development of 930 hp. The plans call for using the water through a Pelton wheel under a 640-ft. head. The company will also change over the lines and equipment of the Cedar Electric Company, which it supersedes, to three phase instead of single phase, as soon as market conditions justify the change.

THE PACIFIC SOUTHWEST

HUNTINGTON PARK, CAL.—The election for \$75,000 water bonds carried in favor of the bonds.

ONTARIO, CAL.—The \$121,000 bond issue for the erection of a school building was carried unanimously.

LOS ANGELES, CAL.—Architects Allison & Allison are preparing plans for the erection of a \$130,000 high school at Orange.

LOS ANGELES, CAL.—M. C. Fallis is planning the erection of a two-story apartment building on Heliotrope Drive, near Rosewood Ave.

SAN PEDRO, CAL.—Ray Mitchell, Harry Carr and A. H. Brown are planning the erection of the Admiral Hotel at 7th and Mesa Sts., to cost \$250,000.

PASADENA, CAL.—Angel & Smith, architects, are drawing plans for a Masonic Temple to be erected at 16th and Chicago streets for Hollenbeck Lodge.

LOS ANGELES, CAL.—It is announced that a new building, to cost approximately \$50,000, will be erected by the Beverly Hill Church, Rev. D. M. Donaldson, pastor.

PHOENIX, ARIZ.—The Constable Ice & Fuel Co. will build a \$40,000 storage plant adjoining their building on West Jackson street. F. C. Stewart is the contractor.

ANAHEIM, CAL.—D. Jessurun, president of the Anaheim Sugar Company, is quoted as saying his company would contract for the erection of a \$250,000 Steffens plant at an early date.

ONTARIO, CAL.—The Ontario Power Company will erect a new power house in San Antonio Canyon to provide additional capacity for its system. The cost will approximate \$45,000.

LOS ANGELES, CAL.—Myron Hunt has been commissioned to design a \$300,000 addition to the El Encanto Hotel in the foothills near Santa Barbara. The plans call for an addition of 100 rooms.

REDLANDS, CAL.—The Redlands National Bank building will be remodeled and two 3-story additions made, according to plans now being prepared by architects Walker and Eisen of Los Angeles.

SANTA BARBARA, CAL.—The contract for the additions to the St. Francis Hospital has been awarded to J. Y. Parker. Three buildings are included in the bid at a total cost of \$215,000.

OXNARD, CAL.—C. W. Sparks was awarded the contract for the ornamental lighting installation. Eighty-six posts will be erected in Lighting District No. 1. The contract price was \$12,866.60.

SAN DIEGO, CAL.—The United States Navy bureau of yards and docks has asked for bids on an ornamental lighting system together with all auxiliary equipment for the naval base at San Diego.

UPLAND, CAL.—The San Antonio Hospital Association will erect a new unit to contain 33 beds. The building will have two wings each approximately 200 ft. by 45 ft. Myron Hunt is the architect.

LONG BEACH, CAL.—The Omar Hubbard Apartment Building to be erected at the southwest corner of Broadway and Cedar avenues will cost \$550,000. John and Donald Parkinson are the architects.

ALBUQUERQUE, N. M.—C. A. Fellows of Los Angeles was the successful bidder for the new hotel and laundry buildings to be erected for the Santa Fe Railway. The figure is said to be \$475,000.

SANTA BARBARA, CAL.—A large annex to the Riviera hotel will be started at once, according to Axel Bern, proprietor. Plans prepared by Myron Hunt call for 200 rooms at an estimated cost of \$300,000.

LOS ANGELES, CAL.—Train & Williams are the architects for an addition to the McKinley Ave. school. An auditorium and administration building will be included in the additions, which will cost about \$250,000.

SANTA MONICA, CAL.—Dr. Frank J. Wagner will erect an office, bank and store building at 401 Santa Monica Boulevard. The contract has been awarded to W. S. Freeman and the work is to begin at once.

LOS ANGELES, CAL.—Lange and Bergstrom, contractors, have the contract on a percentage basis for the new 12-story office and bank building for the Bank of Italy. The work is to be completed by January, 1923.

LOS ANGELES, CAL.—The Standard Construction Company is the contractor for a frame and corrugated iron boiler house to be erected for the Southern Pacific Company near Wilmington at a cost of \$17,613.

CLAREMONT, CAL.—The new chemistry building for Pomona College will be started during January. The contract calling for \$200,000 was awarded to Crookshank and Somers of Pomona. Myron Hunt is the architect.

LOS ANGELES, CAL.—The new 12-story class A building to be erected at the southwest corner of 8th and Spring will be under the supervision of architect Roy L. Smith. W. W. Paden and C. H. Price are the owners of the property.

FLAGSTAFF, ARIZ.—The bond issue for the new high school has been sold by the board of education. With the \$175,000 now available and Norman F. Marsh of Los Angeles commissioned as architect, it is said that contracts will be let immediately.

PHOENIX, ARIZ.—Lynn S. Atkinson, Jr., of Los Angeles, was the lowest bidder on the Cave Creek flood control dam and reservoir. The bid was \$372,294, for a multiple arch dam plus 5 per cent for engineering. Bids were taken under advisement.

SAN PEDRO, CAL.—The Kress Company will lease the new building now being erected by B. B. Lippman at the corner of 6th and Pacific Avenues. Plans are under the supervision of the architects of the Kress Company. The building will cost \$150,000.

LOS ANGELES, CAL.—The Harbor Commission has instructed its engineer to prepare plans for a transit shed to be built at Terminal Island. The building will be of frame construction with corrugated iron exterior and roof, and will cost about \$815,000.

HOLLYWOOD, CAL.—Edward T. Flaherty, engineer, is taking bids for the 6-story fireproof storage warehouse which is to be used by the Premier Fireproof Storage Company. The building will be erected on Santa Monica Boulevard near the intersection of Cahuenga Ave.

JEROME, ARIZ.—Approximately \$160,000 will be expended for a new group of high school buildings in the Jerome District. The plans now prepared by architects Lescher, Kibbey and Mahoney of Phoenix call for structural steel, with hollow tile walls, and stucco exterior.

LOS ANGELES, CAL.—Sealed bids will be received by the Board of Education, at the office of the secretary up to 9 a.m., Jan. 25, for the erection of an addition to the Rowan Avenue school building. Plans and specifications are on file with the secretary, 730 Security Building.

LOS ANGELES, CAL.—Weymouth Crowell has been awarded the contract for a 10-story reinforced concrete brick building to be erected for James H. Adams at a cost of \$568,400. R. D. King is the architect. The building will be located on Olive street near 8th and will be occupied by the Southern California Telephone Co. upon completion.

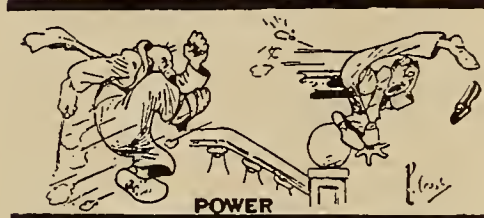
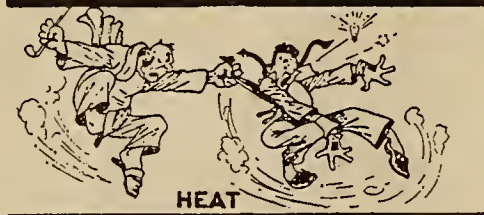
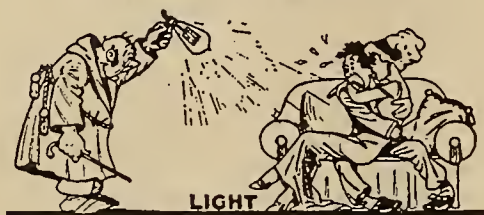
LOS ANGELES, CAL.—Plans are under way for the erection of a \$35,000 factory here by the Pacific Autoplane Co., Figueroa near Vernon streets, for the manufacture of a motor car which can be changed into an airplane, invented and patented by Virgil Moore of El Centro. W. J. Waters has been appointed chief engineer of the plant.

SAN PEDRO, CAL.—The supreme council headquarters of the Chief Petty Officers Association has chosen this city for its headquarters and will proceed with the erection of a \$100,000 club house. The building will have offices, gymnasium, swimming pool, and club rooms for the accommodation of its members. It will be located convenient to the fleet landing.

PALMDALE, CAL.—The Little Rock Creek Irrigation District has contracted with the Little Rock Power and Water Company for water from the dam which the latter company proposes to build in accordance with the application for the diversion of 50 sec.-ft. and storage of 4500 acre-ft. per annum. S. G. Bennett of Oxnard is acting as engineer for the power company.



Light, Heat and Power



—(Stolen).

Rules for Pedestrians

In view of the terrific hazards to which the owner of a motor car is submitted by reason of the growing number of pedestrians who infest the streets, owing to the increasing reductions in the size of apartments and the difficulty of remaining at home, the following ordinance is suggested for general adoption:

1. Pedestrians should honk twice at all street crossings. Special caution is urged against such noises as may be confounded with newsboys or building construction. A musical yodel is recommended, although imitations of the calls of domestic animals have been found to bring satisfactory results in warning motorists.
2. Some item of conspicuous clothing, such as a red necktie or rolled stockings should be worn, to facilitate identification in case of accident.
3. Where the foot passenger is not smoking a strong cigar, or wearing diamond shirt studs, head and tail lights should be carried.
4. Stout ladies must keep to the right of the crossing in order not to obstruct movement of the lighter traffic.
5. Ladies carrying umbrellas will be required to come to a complete stop every forty yards and to raise and lower umbrella as a danger signal before advancing.
6. All pedestrians must carry a license for the privilege of living. Examinations in expert dodging, looking in three directions at once and listening to comments of traffic policemen will be conducted by the coroner's office. Should the applicant be run over during the course of the year, the license fee is not refunded.

* * *

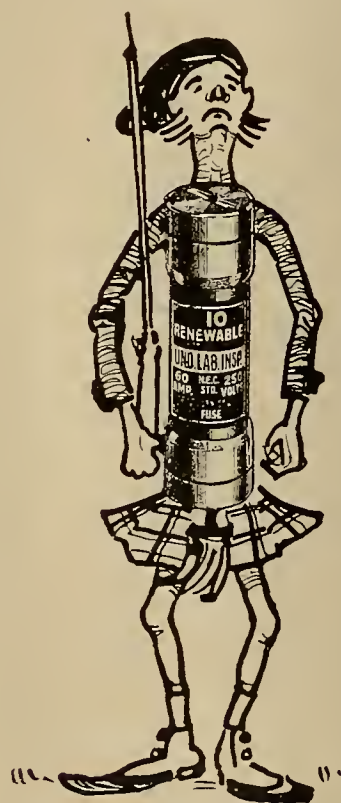
A Substitute for Horsepower

A delightful invention for the lazy man is reported from Maskinonge, Canada, where one J. T. Lemyre has invented a machine actuated by a rocking chair which generates enough power to run the washing machine, sewing machine, electric fan, etc. A factory to manufacture this device is to be built at Sorel, Quebec.

The idea is stimulating. Why not a similar machine installed beneath the baby jumper? Or one which could be attached to the brindle cow's tail in fly time? We have often felt that the gestures of grand opera singers could be put to practical service. If there is no budding tenor in the family, possibly a French cook who is conversational might prove a substitute. There is not enough motion involved in modern dancing to offer attractive possibilities, but households possessing a baby might take advantage of father's midnight walk, thus gaining enough power to warm the milk.

* * *

ELECTRICAL HYBRIDS



XIX — The Electric Fusileer

The electric fusileer
Is a sport as may appear—
At least at midnight blowout's he's a daisy.
He can stand an awful charge
Though the load be very large,
Yet at times his swift collapses drive you crazy.

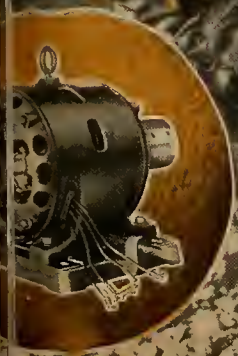
He will keep you in the dark
Till you make a rash remark
When his answer is to sever your connections.
He's a soldier of the line,
Strength and weakness both combine
All the elements that go for your protection.

Journal of Electricity and Western Industry

25 Cents a Copy

February 1, 1922

San Francisco



Century

Motors are an important factor in
irrigating and packing in the fruit industry,
particularly in arid sections of the country.

Century Electric Co.



P I N C O



"The Correct Design"

PINCO Pin type insulators are made for all voltages up to 70,000. We invite engineers to investigate their peculiar characteristics of design and their quality of porcelain.

Three Pacific Coast Stocks

Baker - Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, FEBRUARY 1, 1922

NUMBER 3

Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydro-electric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1921, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Power
Coal Age
Electrical World
Bus Transportation
American Machinist
Ingenieria Internacional
Electrical Merchandising
Electric Railway Journal
Engineering News Record
Engineering and Mining Journal
Chemical and Metallurgical Engineering
Electrical Review and Industrial Engineer

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

83
More Business and Better Business—The Slogan for 1922—The Passing of Cheap Power—Safeguarding the Future of Private Business—Three Interesting New Scientific Advances—The Crushing Urge of Commercialism—Possibilities of Color Harmony in Home Lighting—Flood Control Dams to Stop Waste—Completing 1100 Miles of Transmission—Effect of Disarmament Upon Industry—Regarding the Licensing of Engineers—Combining Public and Private Enterprise.

The Business Outlook in the West for the Coming Year 91

By ROBERT SIBLEY

Outstanding features in the present business situation of interest to the West.

Review of the Agricultural Prospects in Western States 96

By HENRY C. BRECK

Agricultural outlook is bright despite disproportionate declines in price of farm products.

Prospects for 1922 Indicate Improvement in Lumber Market 99

By DAVID T. MASON

An analysis of the present timber supplies of the nation with western angles.

Prospects of Canning Industry are Brighter than Last Year 101

By ELMER E. CHASE

Conditions appear favorable for the marketing of a normal pack during the coming year.

Review of the California Oil Industry During Past Year 102

By WALTER STALDER

Oil production during 1921 has exceeded any previous twelve months period.

Western Mining Operations are Definitely on the Upgrade 105

By FRANK L. SIZER

General improvement in economic conditions will result in resumption of activities.

Better Conditions Ahead for the California Cattle Industry 106

By R. M. HAGEN

Improved financial, feed and labor conditions will benefit cattlemen.

Manufacturing Load Shows Industrial Market for West 107

Survey of the manufacturing activity of the entire West.

Western Industrial Plants Reporting 100 hp. and Over 131

A comprehensive list of plants in eleven western states.

The Forerunner of the Electric Pump—Frontispiece	82
Western Comment on Current Events	86
Letters to the Editor	88
Radio Bulletins	89
Builders of the West—W. E. Creed	90
Metallic Sodium Formed in Sea Water	104
Destruction of Cedar Poles by Termites in California	110
Self Improvement in Salesmanship	111
Increasing Production in Industry	113
Western Dealer, Jobber and Agent	115
Activities of the West	118
Meetings of Interest to Western Men	123
Personals	124
Manufacturer, Dealer and Jobber Activities	126
Business Outlook in Western Market Centers	127
Construction News and New Industrial Developments	128
Salvage	130

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of California, Rialto Building, San Francisco

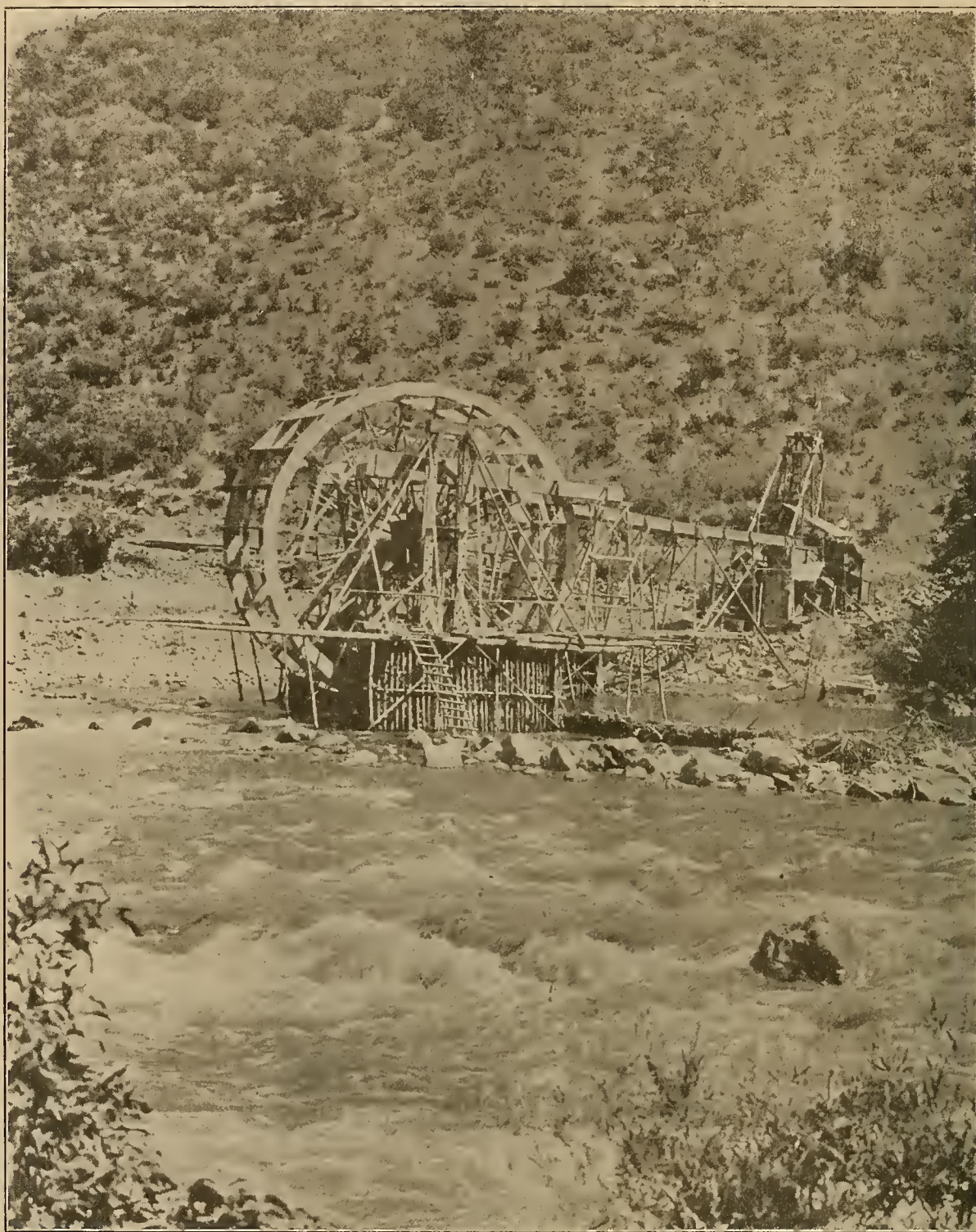
James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



THE FORERUNNER OF THE ELECTRIC PUMP

Dip wheels and impulse wheels, even more cumbersome than the one pictured here, ranging in size from wagon wheels with tin cans fastened to the rim, to great wooden wheels thirty feet in diameter, were used in early days in California for irrigation, pumping and power purposes in mining. Hydroelectric energy, a more efficient

method of utilization of the water powers of the West, has supplanted these primitive machines until over 500,000 hp. in electric pumps is now used in irrigation in California alone. The apparatus above is a dip-wheel on the Klamath river, in California. The water raised by this wheel turns a water-wheel which operates a pump in the mine.

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 3

SAN FRANCISCO, FEBRUARY 1, 1922

Per Copy, 25 Cents

MORE BUSINESS AND BETTER BUSINESS *The* SLOGAN FOR 1922

THE Executive Committee of the National Electric Light Association at its December session in New York City enthusiastically launched a movement that will receive emphatic endorsement throughout the West, namely, that this year's activities from now until the June convention be devoted toward bringing to reality the slogan, "More Business and Better Business."

This does not mean that the important work of the accounting section or the technical section will in any sense be overlooked, but it does mean that a general conviction prevails throughout the nation that immediate emphasis on building the domestic load, both in lighting and appliance uses, can be made to effect national increases in power sales.

At the meeting above referred to, Frank Smith, chairman of the Lamp Committee, outlined effective means as to how the lamp sales can and will be furthered. Wm. H. Atkins, general superintendent of the Boston Edison Company, followed by President Edgar of that company, emphatically stated that central station executives the nation over should be pushing sales, while E. W. Lloyd, of the Commonwealth Edison Company of Chicago, proposed that the slogan for 1922 be, "More Business and Better Business." The resultant discussion brought out the fact that companies such as

the Philadelphia Electric Company, according to a statement by Vice-President Johnson, by pushing household appliances, increased the load of their domestic consumers fifty per cent during the past season. President Bump thereupon announced that he would urge by personal message to all member company executives throughout the United States that the principal business of the present administration be devoted to increasing business, particularly in the domestic field, the central station taking its part in formulating public opinion and in stimulating appliance sales through the regular channels of distribution.

This policy put into practice throughout the nation with particular emphasis in the West means much for the coming season. With distribution lines already serving a vast territory of fruitful possibilities, it is no exaggeration to state that it is within the range of possibility to double the central station load in this region within the next two years. This can never be done, however, without the active dynamic pressure of central station executives behind the move. The opportunity is a great one and the other three branches of the industry stand ready to do their share in the West. Will the active backing of central station executives be forthcoming?

The Passing of Cheap Power

A NEW world wonder in engineering achievement is about to make its initial bow in the putting in of the Chippewa development of the Hydro Electric Power Commission of Ontario, Canada, at Niagara Falls. The undertaking sprang from comparatively modest proportions, namely, a ditch that would cut out from Lake Ontario above the Niagara Falls and by-pass the water not only below the falls but on down beyond the rapids, thus taking advantage of a complete drop of some three hundred feet. An original development of one hundred thousand horsepower was contemplated at a cost of ten million dollars. Today, however, the people of Ontario, Canada, are facing the development of five hundred thousand horsepower involving a total outlay of money for the project mounting upwards to some

eighty millions of dollars, and in order to acquire sufficient water rights to fill the canal with 18,000 sec.-ft. of water required for this vast power, it is now deemed necessary to purchase the Toronto Power Company's plant of 125,000 horsepower at a cost of thirty million dollars additional and thus again add greatly to the original unit cost of developed power.

The West congratulates the East on the near accomplishment of a new and interesting feat in engineering achievement in this wonderful Chippewa development, but it is interesting to note in passing that California and the West will continue to lead not only the eastern United States in the cheapest unit cost of power to the consumer, but now due to the vast increased cost of power at Niagara Falls, the West with its private developments bids fair to surpass even that district, which was long looked upon as favored.

Safeguarding the Future of Private Business

THE Weinstock Lecture at the University of California this year was given by Wigginton E. Creed, president of the Pacific Gas & Electric Company, who chose as his subject the safeguarding of the future of private business.

In his address Mr. Creed brought out most forcefully the modern tendency in business ethics wherein the old saying of "Let the Buyer Beware" is being replaced by the modern slogan of "Truthful Advertising," laying especial emphasis on the fact that modern business is thoroughly convinced of the truism that honesty is the best policy.

The question then arises as to how private business with its ever-increasing idealism is to be safeguarded. The answer is to be found in due attention to the development of personnel or morale within the organization. That organization which within itself holds honest policies as the best policies and wins its employees completely to itself by its evident sense of fair treatment both to the public and to its employees is founded on a rock that cannot be shaken.

There is a tendency on the part of government more and more to regulate and interfere with private life and business. After all the only way to meet this danger is for business itself—great as has been its evolution toward higher ideals—to give even more in order to justify its existence. Business ought to be the leader and not the led, and since true leadership is founded upon high spiritual ideals rather than bull strength, the public at large has a right to expect a leadership of intelligence from business that is placed upon such a high plane of ethics as to be impregnable against any assault. By such a course alone can the future of private business be properly safeguarded.

Three Interesting New Scientific Advances

IT is difficult to record all the new advances that are constantly being made in scientific and industrial development in America. A recent inspection of eastern enterprises brings to light three interesting and important advances. The installation of an electric light in the outer harbor of New York City of 1.2 billions candle power, which though designed for maritime use, presents the possibility of thrusting a beam upward into the heavens so that inhabitants on Mars, if there be such, could recognize New York Harbor as a star of the sixth magnitude, is at once interesting and fascinating. The exhibit at the Bureau of Standards of a new advance in the manufacture of optical glass of such clarity that one may readily read a typewritten page through a section of this glass fifteen inches thick portends new advances in optical evolution in the near future. And again, the development of the Ultra Micrometer at the Bureau of Standards capable of measuring so delicately that the one billionth part of an inch may be ascertained is an astonishing new scientific achievement. The principle upon which the instrument

works is based upon the law of two parallel circuits exactly in tune which upon any slight variation in one of the circuits throws the two out of tune and produces harmonics that can be measured with such delicacy that the billionth of an inch is under control in observation. Of course, such delicacy as this is so subject to extraneous forces that it presents a great problem in securing the necessary isolation to bring to use such minute observations.

These typical instances serve to show, however, that America is not backward in the development of new and interesting advances that are each day, even though the thrilling urge of war time necessity has long since passed, placing her scientific research well in advance of the nations of the world.

The Crushing Urge of Commercialism

EVERYWHERE one goes there seems to be an overpowering urge to pull the workers away from specialization back into general commercial pursuits. From Paderewski, the world famous pianist who has recently announced his intention of forsaking the professional career for the raising of almonds in California, to the professional man who has gone into business fields,—go where you will, the general urge will be found the same. Consult the highly specialized experts of the Bureau of Standards or the purely technically employed engineer, and you will find that on the surface, the reason seems that all have become body worn and somewhat brain fagged over specialization. The deeper inquiry into the reason, however, largely brings forth the answer that specialization does not hold the reward which the effort involved should command. Certain it is, however, that the large majority of specialists in engineering practice are justified in their complaint that the man who wields the executive control or who runs the end of the business where the money is made, receives far more consideration than the specialist whose brains make possible the enterprise upon which the money is made.

It is all a sad commentary on our modern age of commercial ego and the selfish appraisalment of value that is given by those who have the directing of industrial and engineering activities. But the sadder aspect of the case is that unless the situation is remedied, another generation may find industry and engineering woefully lacking in specialists.

Possibilities of Color Harmony in Home Lighting

WE are hearing much of new effects achieved in the art of stage lighting. Without any change in physical property, it is possible to simulate a change by variation in color values produced by concealed sources of electric light as reflected by especially prepared wall and ceiling surfaces.

It has remained for some venturesome illumination pioneer to follow this same thought in the interior lighting arrangements for the home. As a matter of fact, the experiment in the home has been

going on for some years. Without any expense for changes in draperies, walls or shades, a wide variation in pleasing effects is produced by providing four-circuit fixtures of the semi-indirect type equipped with blue, green, amber and white globes.

Economy, novelty, and utility seem to lend forceful argument to a fair trial for this innovation in adapting electricity to the needs and enjoyment of the modern home.

Flood Control Dams to Stop Waste

WITHIN the last few months we have had attention directed to flood conditions in nearly every section of this great West. In some instances by superhuman efforts in protection measures, the damage due to overflow was reduced to a minimum. The same conditions are sure to recur unless means are developed to make such conditions impossible.

Along with this solution of the flood problem it is well to have in mind the conservation of these waters for the future use of industry and commonwealth. If underground supply is not an unlimited source, and in many instances this is apparent, any diversion of surface water by check dams or other similar expedients will prolong the usefulness of artesian or pumped supply systems. Storage dams should intercept the run-off of storm water at such elevation that gravity will carry this water to the place of future usefulness. Damsites are more easily obtainable before agricultural development takes place. The conservation of flood water purely as a source of future supply is now recognized as a problem of the near future in some sections of the West.

Completing 1100 Miles of Transmission

ANNOUNCEMENT from the California Oregon Power Company of the construction of a 110,000-volt transmission line from Glendale to Eugene, Oregon, closes a 115-mile gap which existed between the transmission systems of the Northwest and the great interconnected group of California companies. A continuous transmission system now stretches from Sherman County, Oregon, to the Mexican border—a superpower zone of far greater extent than any ever considered elsewhere in the world. It is not proposed, of course, to transmit power direct from one end to the other of this distance, but complete interconnections between companies make it possible to shift blocks of power from one division to another, so that sectional droughts or shortages from other causes may be ironed out for the entire coast. There remain only two short gaps in southern and eastern Washington to complete the 1800 miles of transmission from Montana to the coast and thence to Southern California. The California interconnections have long ranged among the pioneering achievements of this section; the present construction greatly enlarges not only the magnitude of the accomplishment, but the area which is to be benefited, extending these safeguards and advantages to the great fertile area of the Northwest.

Effect of Disarmament Upon Industry

THERE has been much speculation as to what effect upon industry the ten-year holiday in naval construction may have. In round numbers, the holiday proposed will probably effect a saving of, say, one hundred million dollars annually. About fifty per cent, or fifty million dollars annually, is the labor charge-off; the other margin is practically concerned with the steel industry. The best experts agree that this will only affect industry as a whole to the extent of about 3/10 of 1%, certainly not greater than one per cent as a most liberal allowance. In any case the naval holiday under the international agreement proposed is to be welcomed, but it is at the same time gratifying to note in passing that there is little paralysis in industry as a whole to be anticipated from putting into practice the ten-year holiday program in naval construction.

Regarding the Licensing of Engineers

WE are thoroughly in accord with the present policy of the Federated American Engineering Societies wherein the enactment of laws for the licensing of engineers is not advocated, but in those commonwealths where local engineers desire it or where conditions are so forced upon the engineering profession that the situation must be met we believe that everything should be done to see that such laws are passed as will best maintain the dignity of the profession and yet at the same time leave the engineer's relations with his client unhampered.

The Federated American Engineering Societies have worked out a model licensing law and we strongly urge upon all engineers interested to secure a copy of this draft.

Combining Public and Private Enterprise

SERIOUS thought might well be given to the possibility of utilizing the combined strength of public and private enterprise in the West. That part of great irrigation storage control or power supply development work which may truly be chargeable to investment capital might perhaps be financed by government guarantee, whereas all that capital necessary for operating might well be completely under private control. Such a division of the financial responsibility would lessen the interest rate involved and at the same time would seem to have sufficient merit to warrant deeper consideration.

Surely there is some way whereby the lowest rate of interest obtainable can be utilized for developing western resources without sacrificing the advantages of private initiative. The constantly increasing favor with which utility securities are being sought in those states where commission regulation is most advanced, is a striking indication that the day is not far distant in which public service securities will approach parity with the lowest interest bearing securities on the market.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing,
Trade Promotion, Legislative and Associated Topics that have a
Special Bearing on Western Business

Electrical Exports Show Distinct Gain

U. S. Department of Commerce Figures for 1913
and 1921 Record Large Increase in Value;
Predict Better Business in 1922

ELECTRICAL exports for the United States for the year 1921, as compared with 1913, very positively contradict the pessimistic ideas of the export trade so far as the electrical industry is concerned, according to figures prepared by the Department of Commerce. Compared with 1913, which is taken as a fair pre-war year, the increase in value of exports is far beyond the influence that is exerted by rise in prices. Quantities also indicate a decided increase.

The figures given below indicate the gain that has been made, the data for 1921 involving a preliminary estimate for the month of December based on the average for the preceding five months.

Article	1913	1921
Dynamos and generators.....	\$2,374,122	\$8,022,000
Fans	415,774	1,271,000
Lamps:		
Arc	134,053	14,000
Incandescent—		
Carbon filament	254,893	127,000
Metal filament	301,791	3,104,000
Motors	4,886,508	15,222,000
Telegraph apparatus (incl. wireless) ..	147,233	995,000
Telephones	1,659,326	4,732,000
All other	18,923,663	62,478,000
Electric locomotives	250,843	2,388,000
Totals,	\$28,448,206	\$98,353,000

While it is difficult to judge what 1922 may have in store for the electrical industry, all indications point toward a better condition for its export trade. The world is making use of electricity as never before, and American manufacturers are readily able to take a fair share of the over-sea business offering.

U. S. Court Ruling on Refusal to Sell

Beech-Nut Company Decision Re-opens Question
of Right of Manufacturer to Refuse to
Sell to Price-Cutting Dealers

CONFUSION only has resulted from the decision of the United States Supreme Court, handed down recently, reversing the decision of the Circuit Court of Appeals, and holding that the Federal Trade Commission was within its rights in ordering the Beech-Nut Packing Company to cease and desist from certain trade practices which had for their purpose the control of resale prices on its product. Despite the fact that there has been a unanimity of opinion that the decision resulted in absolute de-

feat for the packing company, Mr. Charles W. Dunn, counsel for the company, sums up the situation in the following words:

"The entire Court sustains the right of the Beech-Nut Packing Company to decline to sell its products to dealers who do not observe the fair resale prices suggested by it, holding that such refusals to sell, per se, effected by a private manufacturer in pursuance of his own independent discretion, and without any purpose to create or maintain a monopoly, are not violative of Section 5 of the Federal Trade Commission Act. The Court directs that the order of the Federal Trade Commission be modified whereby the prohibition of such refusal-to-sell conduct, per se, set forth therein, is wholly stricken out. The principal issue involved in this case, from the beginning, was whether the Commission had the power, under the Act creating it, to forbid the Beech-Nut Packing Company or any other manufacturer from refusing to sell its goods to dealers who fail to observe suggested prices, where such refusal is made in pursuance of the manufacturer's independent discretion, without any purpose to create or maintain a monopoly. The entire Court upholds this right of refusal and denies the power of the Commission to limit it. The four dissenting members of the Court hold that the order of the Commission should have been wholly set aside and not modified even to the extent indicated in the light of the record in issue. The main point to observe, however, is the affirmance of the refusal-to-sell policy, per se, under the Federal Trade Commission Act, just as it was affirmed in the Colgate case under the Sherman Act."

It is now universally conceded that the situation can only be remedied through the passage of legislation along the lines of the proposed Stephens-Kelly Bill. In no other way can the right of a manufacturer to control the resale price of his product be re-established and all related questions be lifted out of the mire of legal precedent created by this and other decisions.

Seattle Hits Snag in Utility Control

Deficit in Interest and Redemption Fund for
Street Railway Bonds Causes City Officials
to Adopt Drastic Measures

FORCED by the necessity of having on hand funds with which to meet principal and interest amounting to \$1,237,750 due March 1, 1922, on the \$15,000,000 in bonds issued in payment for the city traction lines, officials of the city of Seattle have placed the semi-monthly street railway department payroll on a warrant basis. Railway employees receive in place of the usual pay checks, warrants stamped "Not paid for want of funds." These warrants, which bear six per cent interest payable from the street railway fund, must be presented to banks for payment, either with or without discount, as the banking officials see fit.

Disbursements for supplies and miscellaneous expenses have been on a warrant basis for several weeks and it was found that only by placing the

payroll on a similar status could funds be acquired to meet the city's obligations on the bonds. Every penny of the daily receipts of the car lines, which average approximately \$17,500 per diem, would be needed to make up the deficit of \$274,449 which existed in the interest and redemption fund on January 10. The contract of purchase of the lines calls for the payment of interest and redemption thirty days before due.

As soon as the deficit is made up, receipts will again be turned into the street railway fund and the warrants called in as rapidly as the condition of the fund will warrant.

Electric Railways in Serious Position

Expert Tells California Real Estate Association
That Practically Every Privately Owned
Road Is Technically Bankrupt

PRACTICALLY every electric railway in the United States is technically bankrupt, according to a statement made by Guy W. Wolf, manager of the research department of the California Real Estate Association, at the annual convention of that body in Oakland, California, recently. Mr. Wolf in speaking on the subject of "Electric Railway Transportation in Relation to the Enhancement of Realty Values" voiced the opinion that, with few exceptions, the securities of such utilities were below par, their earnings not equal to their fixed charges and their borrowing power greatly reduced if not negligible.

Mr. Wolf said in part:

"This unhappy condition of the roads is due to a combination of circumstances. Automobile competition in most cities, the jitney, robs the companies of the cream of the trade without any opportunity for recouping the loss in other directions.

"The shortsighted policy of local authorities in limiting fares, in placing hampering charter restrictions upon operations and extensions, and in requiring outlays which do not properly belong in the category of the railroad company operating costs, have combined to drive most companies into bankruptcy.

"The consequence has been that no single privately owned electric railroad in the state of California is now or has been for several years making any extensions. The high cost of new money, the hampering local restrictions and the unfair competition of other transportation agencies makes it unwise for the companies to attempt necessary extensions. The cities of California are multiplying their population by from 25 to 50 per cent every ten years, but there are not now in prospect any material additions to the electric transportation facilities in these cities."

This is a matter which, as Mr. Wolf says, demands the attention of all fair-minded citizens, as well as the real estate man, whose prosperity depends indirectly upon the transportation facilities to the property which he is trying to sell.

Court Decides Against L. A. Bond Sale

Los Angeles Saves Approximately \$2,000,000 as
a Result of Decision that Power Bonds
Must Be Re-sold

THE sale, without public advertisement, of \$13,500,000 electric power bonds to the I. H. Hellman interests at a discount of \$1,535,000 by the Los Angeles City Council has been declared illegal and invalid by the Supreme Court of California.

The bonds were voted early in 1921 for the purpose of purchasing the distributing lines of the Southern California Edison Company inside the city of Los Angeles and at the same time making other hydroelectric improvements. At the time of the issue the bond market was such that the bonds could not be disposed of at par with the five per cent interest set by law. At the recommendation of the Public Service Commission the entire issue was authorized to be sold to I. H. Hellman at a discount which would tend to increase the interest to approximately six per cent.

Immediately following the announcement of the sale, injunction suits against the council were filed in the Los Angeles county courts. The action of the council was upheld and the sale held legal. The case was appealed and the decision of the Supreme Court apparently settles the matter. Mayor Cryer has refused to affix his signature to the bonds since the legal proceedings against the council were instigated so that the sale has never been carried through.

Presuming the sale of the bonds at or above par, with the improved bond market, some \$2,000,000 is thus thrust upon Los Angeles under the present decision.

Oregon Body Scores Tax-free Securities

State Chamber of Commerce Goes on Record as
Approving Legislation Which Would
Equalize Burden of Taxation

UNANIMOUS approval of a resolution asking that legislation be passed by Congress equalizing the burden of taxation, the major portion of which falls upon private enterprises whose securities are not tax exempt, was the feature of a recent meeting of the Oregon State Chamber of Commerce. The resolution follows:

Whereas, our present policy of Federal taxation has undergone a most radical change from that of indirect to direct taxation, and

Whereas, such change has resulted in chief reliance being had upon a graduated scale of taxation upon income that levies high rates upon those of large income, and

Whereas, by reason of such rates there is a constantly increasing volume of capital being invested in and diverted into non-taxable securities of the federal, state and minor subdivisions of government and instrumentalities of government, and

Whereas, the investment and diversion of such capital has proved a serious handicap to productive enterprise and has given to such exempted securities an unfair competitive advantage in the markets for capital, and

Whereas, such investment on the part of those of large income serves to exempt them from the payment of taxes they otherwise would be obliged to pay, and

Whereas, there is thereby necessarily imposed upon those who cannot benefit by such exemption an unfair burden of taxation;

Now, Therefore, Be It Resolved by the Oregon Chamber of Commerce in third annual convention assembled, that it recommends that necessary corrective legislation be provided to remove the present inequitable burden of taxation and to make all income from whatever source and in whatever form bear its just proportion of the cost of government and remove the discrimination now prevailing between securities of government and those of private enterprise.

Such move on the part of the Oregon State Chamber of Commerce is indicative of the feeling of many other organizations in the West. Any legislation which would facilitate the development of the hydroelectric and other resources of this western empire, as such legislation would by turning money to investments in public utility securities, is highly welcome at this time.

Letters to the Editor

American Valuation Association Presents Views on Proposed Plan

To the Editor:

Sir: We wish to impress on the trade journals of the country the importance of supporting actively as well as tacitly the American Valuation Section of the tariff measure now pending in the Senate.

In the past the tariff has been a party issue, and with an administration and Congress of the same political faith it would be ordinarily fairly easy to forecast the approximate character of forthcoming tariff legislation. For the first time in history there is a sharp division in the leading parties on the tariff issue. Due to conditions growing out of the war, the pending tariff legislation is an issue on which party lines are almost entirely ignored, thus introducing an element of uncertainty at a time when normally the result would be a foregone conclusion.

The time has come when every silent conviction favoring the protection of American industry and national prosperity should be given expression in words so clear and unmistakable that the concert of patriotic public opinion will drown for all time the clamor of un-American propaganda that has lately been loosed upon the country, menacing our manufacturing with industrial paralysis and millions of our citizens with a European brand of poverty.

This menace is not imagined. It is real. The real voice of America must speak out so unequivocally that no Senator in Washington can be in doubt as to the tone and quality of sober American thought on this insistent and far-reaching issue. We must not allow paid propaganda to pass for American public sentiment.

It has been stated that the importers and large mail order houses have spent in the last few months over one-half a million of dollars in propaganda against the adoption of the American Valuation Plan. The majority of manufacturers of this country are in favor of its adoption. The National Association of Manufacturers, composed of 6000 members representing perhaps the largest group of manufacturers in the United States, recently held a referendum on this subject and over 75 per cent of the replies favored its adoption. The Southern Tariff Association has come out strongly in favor of the American Valuation Plan, and wherever there have been meetings of local associations held to pass on this subject the majority of the membership has endorsed it.

We believe that if you sound out your advertising clientele, who in nearly all cases are manufacturers in this country, you will find them almost unanimous in favor of its adoption because conditions with them today are not a theory but a fact.

The argument that the adoption of the American Valuation Plan would destroy our foreign trade does not take into account that only 12.06 per cent of the goods imported into the United States is affected by ad valorem duties, that 61.08 per cent comes in free, and that 26.52 per cent is admitted under a specific duty. These figures are taken from a report prepared by the United States Tariff Commission. It is thus seen that 87.94 per cent of the imports would not be affected, regardless of what is done with the 12.06 per cent that come under ad valorem rates. This 12.06 per cent, however, does have a vital bearing on the industries of this country because

of the fact that they represent the larger bulk of goods that have undergone complete manufacture in the country of export, and in consequence have a more direct bearing on the manufacturing industries of this country.

These data have been called to your attention because, in our estimation, they have not received the prominence that might well be given to them in quashing arguments put forth by importers tending to give the impression that the adoption of American Valuation would result in a general upheaval in the administration of the tariff. While it is relatively a small part of the tariff administration, it is an exceedingly important part in that it vitally concerns the basic sources of American prosperity.

H. L. HENRY, Vice-President.

American Valuation Association

Obvious Objections to American Valuation Plan Cited by Importer

To the Editor:

Sir: Regarding the American Valuation Plan proposed for the new tariff, there appear to be several obvious objections while whatever advantages it may have appear less clearly. American importers seem almost solidly to oppose the change. The present system of determining value for customs purposes at the place and date of export has been in effect for over a hundred years, and importers hold that during that period very effective machinery has been developed by the United States Customs service.

The proposed scheme would have the value determined by the wholesale price in the principal markets of the United States of comparable or competitive merchandise manufactured here, or, if there were no such goods produced in this country, by the value of the imported articles. It is true that many importers in voicing their objections to the suggested change overlook the fact that such valuation is to be established as of the date of export from the country of origin. They argue that if duty is to be levied upon the basis of the price in this country, they will not take the risk of fluctuation, but will be compelled to sell in bond, rather than with duty paid as at present. This would be true if the valuation were to be set upon arrival of the merchandise in this country, but the plan does not contemplate such a measure, but provides that valuation shall be reckoned as of the date of exportation. Therefore, the importer will be in a position to know the amount of duty he must pay as soon as he receives advice of shipment, and, accordingly, he will be enabled to sell his goods duty paid while they are afloat, just as he does now. Therefore the impression which many importers hold, that they must remain in ignorance of the duty cost during the period between shipment and arrival, is unfounded. Of course, when they buy goods for future shipments, they will have to take the risk of fluctuating value, which is true of the present system as well.

The matter of establishing the value in this country, however, appears to present a real difficulty. As it stands the measure proposes that the wholesale prices in the principal markets of the United States shall govern. But what are those markets, and when a different wholesale price exists in each, which price is to govern? Japan has a growing salmon-canning industry. It is not impossible that at some future date Japanese salmon may find its way into this country and be subject to a duty. Pacific Coast salmon has a different value in Seattle, San Francisco, New York, and Chicago, all of which cities might be classed as among our principal markets, and it would appear to be an arbitrary choice to base the valuation of the Japanese product upon any one of those prices.

Owing to the great size of our country there are many divergencies in the values of goods in the various sections. This would necessarily be the case, even if the freight alone governed the situation. But there are other factors as well. It frequently happens that stocks of certain goods move to particular markets within the country in excess of the immediate demands of those markets, and the values of such accumulated goods temporarily decline. There appears to be no reason why this local value should have a necessary influence upon the amount of duty which must be paid upon similar merchandise brought into another section of the country.

Another objection is urged, which would apply even if the technical problem of determining domestic value were solved. It happens that articles appear on the list of dutiable imports which are in the same classification, but of which one may have a value when it arrives here of which the freight charge forms a small percentage, whereas the value of another may be made up to a considerable extent of the cost of transportation. The American valuation system would increase the duty upon the latter article to such an extent as to prohibit its importation.

Supporters of the measure urge that its adoption would equalize the duty on goods from countries with a low and a high cost of production respectively, and likewise on goods from countries with a low and a high cost of production respectively, and likewise on goods from countries with a stable currency and countries whose monetary unit is greatly depreciated. This would amount virtually to protecting foreign countries against one another, which should not be any particular concern of ours.

It may be that the investigation of the American Finance Committee will develop good reasons for adoption of the plan, but in its present state it does not appear wise to substitute it for a system which has been most thoroughly worked out.

HILMER J. OEHLMANN.

H. M. Newhall and Company, San Francisco.

An Appreciation of "The Dollars and Cents Standard of Industrial Success."

To the Editor:

Sir: One cannot read Mr. Leurey's "Second Contribution" in your January first issue, without several touches of the old-fashioned "Amen." How vital it is in modern industrial efficiency to avoid the "frozen investment." Capital wasted, misused in improperly planned and badly executed extensions, is lost. Such wasted capital has no second chance to benefit humanity. Its efficiency, its value has been ruined; its creation has reverted quickly to death and its life added little to man's service.

I speak as if capital were animated and we do in a measure make it animated when we cause it to serve us wisely. A famous painter once said that he mixed his colors with brains and, just so, if we invest our capital with brains, we reap a just reward while the industrial world as a whole receives the benefit from the general advancement.

The equation of industry is not always a simple expression. The specialists can often grasp the ultimate economic values, supply the basic plan and spend capital more wisely than those in immediate command. The man, active in our western industrial field, who knows that B.t.u.'s and dollars cannot always be equated, has a vision beyond apparent facts or hasty conclusions. An electric B.t.u. has a wonderful future ahead in our Pacific Coast territory.

ALFRED H. POTBURY, Engineer.

Coast Equipment Company, San Francisco.

Radio Bulletins

The Journal of Electricity and Western Industry is sending out each week by radio-telephone a report on the outstanding engineering and industrial developments in the eleven western states, together with a concise review of business conditions in the principal cities in this district. The following excerpts are representative items taken from messages sent out.

The Greater California League has been organized to combat the proposed state amendment which authorizes the formation of a board to supervise the development of all water and power resources in that state. The state would be bonded to the extent of five hundred million dollars to pay for these developments.

The Portland Railway Light and Power Company is preparing plans for an 80,000 horsepower hydroelectric project on the Clackamas River near Mt. Hood. The road into this section of Oregon is already under construction and work on the actual project will commence as soon as supplies and material can be transported into the mountains.

The harbor at Coos Bay, the ocean outlet for a large portion of the lumber of Oregon, will be improved during the coming year when the government will spend in excess of three million dollars to make the harbor navigable for large ocean-going steamers.

The gold and silver output for California during 1921 was in excess of nineteen million dollars according to the U. S. Geological survey reports.

Portland is the only port on the Pacific Coast to show an increase in the value of its exports for 1921 over those of 1920. The increase was approximately ten per cent, the total value of the exports being sixty-seven million dollars.

The Fitzsimmons Hospital in Denver, a government institution for the rehabilitation of world war victims, has recently installed one of the most powerful radio phone sets in the intermountain district. The station is used for the instruction of veterans as well as the broadcasting of government messages and radio concerts.

Three million feet of timber near Aberdeen, Washington has been placed on the market by the government. The final day for the receipt of bids on the tract has been set as March 30. The timber is valued at \$2.50 per thousand board feet.

Secretary Hoover will hold the first hearing of the Colorado River Commission in Washington on January 26. The meeting will discuss the development of the Colorado with a view of immediately formulating plans for flood control irrigation and the production of power.

The following reports are of business conditions in the principal Western cities:

Los Angeles: Forty-seven new industries were established here during December. Building permits for January will exceed six million dollars. The customary first-of-the-year slump apparently has not affected business.

Portland: Orders for lumber are being received faster than the mills can handle them and there is a possibility of a shortage of logs. Railroads are again active in the lumber market. Shipping active while wholesale sales are picking up.

Seattle: Twenty-nine steamships are scheduled to sail from this port for the Orient during this month. Reports on the grain and fruit crops for the past year show increased production and large profits. Sales, both retail and wholesale, are below normal.

Salt Lake City: War Finance Corporation loans have assured a successful year for the sheep, cattle and sugar beet raisers, and have eased the situation in this section. Collections are only fair while sales are inactive.

Denver: There are indications that wages in the building trades will be reduced shortly. The mines are slowly approaching normal, although the effects of the recent coal mine strike has not worn off. Unemployment is increasing owing to seasonal inactivity.

San Francisco: The city is in the midst of a building boom following more than a year of inactivity. Office buildings, dwellings and apartment houses are under construction while architects report plans for many more are being prepared. A completely equipped electrically operated restaurant was recently opened.

Builders of the West

THERE is, perhaps, no figure in the public utility field who possesses to such a high degree the manifold and exacting qualifications of an executive of a corporation devoted to the task of serving the public, than does Wigginton E. Creed, president of the Pacific Gas & Electric Company. It can also be said that no man is more clearly conscious of the fundamental role which the utilization of hydroelectric resources of California will play in the economic, social, industrial and financial development of the West.

Mr. Creed has been president of the Pacific Gas & Electric Company since July, 1920, but prior to that had been a prominent figure in the public utility arena. He had already distinguished himself by his views on public policy, utility regulation and the relationship and importance of building up an understanding between an organization and its consumers and security holders, through his previous position as president of the East Bay Water Company. It is the consistent policy of the Pacific Gas & Electric Company to fit the man to the job, the evident motto being "Don't buy anything if you have it in stock." The result has been the development of a loyal and efficient "Pacific Service" which is second to none in its field. It is his belief that the foundation of the success of a public utility is the rendering of service, and that the greatest safeguard is a wide distribution of securities among consumers. In this, the company has had remarkable success.

Mr. Creed was born in Visalia, California, and was educated in the public schools of Oakland and in the University of California. He possesses an intimate knowledge of the particular conditions that relate to California and to the West, its people, their needs, wants, aims and ambitions. He was an active participant in all forms of student activities while in college and was particularly successful in journalism, being editor of the collegiate daily paper. After graduation in 1897, he taught school in Fresno, California, that he might continue his study of law at



WIGGINTON E. CREED

President of the Pacific Gas and Electric Company and other industrial enterprises, who is an active figure in promoting the progress and development of California through the utilization of hydroelectricity.

Columbia, his aim being to follow in the footsteps of his father, a noted California attorney. Upon the completion of his law course he started practice in San Francisco and his success was such that when litigation which promised to require an interminable amount of labor and legal acumen seemed imminent, concerning municipal rates on water furnished the city of Oakland by the Contra Costa Water Company, Mr. Creed was selected to conduct the siege. So marked was his success in winning his battle and mastering the intricacies of the public utility game, that he was induced to undertake the presidency of the company which later became the East Bay Water Company. His management of the affairs of that company in its reorganization and financial rehabilitation stamped him at once as an executive of unusual ability.

Mr. Creed is a follower of the "strenuous life," is an outdoor enthusiast, being particularly addicted to all forms of hunting and fishing. He is particularly fond of hunting mountain lions, and prefers horseback riding to golf. It is also reported that he is fond of regaling intimate friends with savory examples of his culinary skill, specializing particularly on wild game.

In addition to his public service work, he has had marked success in the management of the large affairs of the Columbia Steel Company, and also the manifold duties appertaining to the C. A. Hooper Lumber Company and its subordinate interests, serving as president of both of these large industrial concerns. On his character, reliability and fitness for service he was chosen president of the Alumni Association of the University of California and as such served on the Board of Regents of that University for several years.

To W. E. Creed, then, for the exercise of indomitable ambition and unflagging energy in the promotion of a better public understanding of the duties and requirements of a public utility, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

The Business Outlook in the West for the Coming Year

Some Outstanding Features in the Present Business Situation Which Will Be of Interest to Business Men of the West in Formulating Their Plans for the Coming Year

By ROBERT SIBLEY

Editor, Journal of Electricity and Western Industry



STUDY of previous business depressions indicates that the Pacific Coast experiences a business depression or a season of prosperity from one to two years after the inception of such a disturbance in the eastern industrial districts of the nation. The typical path of a business disturbance is a radiation outward from the eastern states, gradually spreading to the Pacific Coast. This tendency has been apparent in the present reaction, although

the West as a whole has not felt the effects of deflation as keenly as other sections. The Northwest has felt the depression very keenly and is now apparently reviving due to improvement in lumbering, but the southern portion of the Pacific Coast has been affected to a lesser extent. This is due in a measure, no doubt, to the absence of a post-war inflation experienced by many eastern centers, and consequently the reaction has been more moderate. Some authorities assert that in these sections of the West the depression has been merely postponed and that a decline is inevitable.

There are, however, certain outstanding reasons why the Pacific Coast will not feel this slowing up during the coming year, particularly if due attention is given to business-getting ideals and practices that are now being formulated, not only in this section of the country but in the nation at large. While it is true that our progress may be forecast by the application of indexes indicative of the prevailing business conditions, it is also true that there is an enormous field of progress independent of such influences.

The electrical industry particularly, due to its far-reaching ramifications, should take the lead in searching for new channels of business and in actively putting into operation effective sales methods to attain these results.

Outstanding Features of the Present Business Situation

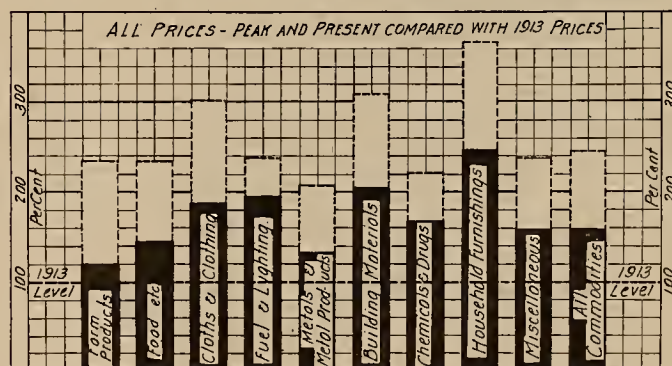
Let us then proceed to analyze, first, some of the outstanding features of the present business situation, and then call attention to other influences that are at work to better the situation. During the yearly period prior to the past six months our country experienced the most precipitous price drop in its history, which averaged nearly 50% and caused

the writing-off of some \$20,000,000,000 of the assets of the nation. Under this violent falling in prices farm products received a reduction too drastic, while the costs of coal, freight rates and general construction are still far above the pre-war average. There are, however, gigantic economic forces at work today which are bound to equalize this unbalanced situation. A fortunate result of all this readjustment, however, has been reduced inventories in factories and warehouses and on retailers' shelves. In addition cost accounting methods of manufacturers are in a high state of development that will go a long way toward bettering the economic problems before the nation.

On the other hand, the problem of distribution, particularly in the electrical industry is far from satisfactory. It is safe to say, however, that the violent reductions in wholesale prices that have been under way prior to the six months' period just closed have brought prices as a whole sufficiently low to assure no more of the unprecedented fluctuations in the months immediately ahead, as were experienced in the critical period prior to the six months' period behind us.

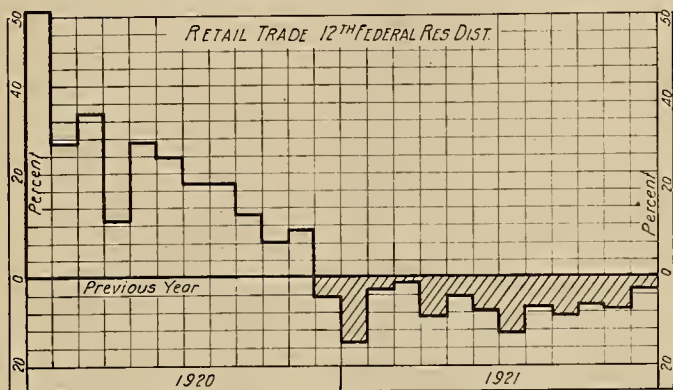
The International Situation

Looking afield, the international business situation seems to be more stable, due to other causes of international interest that have been violently at work since the termination of the war and seem now to be reaching somewhat of a fair solution. The general realization that German reparations, war reimbursements, unbalanced budgets, and inflated currencies must all be adjusted is the conviction of business men throughout the world. The world, outside of Europe, has been engaged most actively during recent months in liquidating the post-war boom



Note in this comparative sketch of all prices—peak and present compared with 1913 prices—how the violent fluctuations of recent months have left a decidedly unbalanced price level among various commodities. Building materials, for instance, are seen to be far above normal, while the high level of house furnishings make the completed home still an almost impossibility for the average householder to attain. The great downward trend of prices of all commodities is now greatly abated but the inter-relationship of prices of one commodity as compared with another still has great room for improvement.

and shows definite signs of recuperation. The surplus in goods is rapidly being absorbed and one of the hopeful features of the situation so far as America is concerned is the fact that competition of European manufacturers in these markets is proving not nearly so disastrous as most economists had thought might be the case. This is clearly shown by a study of the comparative trade reports of the countries of the world in which it will be found that American trade has held up remarkably well. Summing the international situation up as a whole, it would seem that



A chart showing the condition of retail trade in seven western states as reported by the Federal Reserve Bank of San Francisco. The interesting thing about this chart is that retail sales began to fall off in percentage the early part of 1920 and continued through the early months of 1921. During the last six months' period, however, there has been a gradual recovery in retail sales and it is believed that this general betterment will continue during 1922 so that by December, 1922, an increase in sales of, say, 15% over the present year will be reported.

Americans generally should feel a deep source of gratitude in the fact that our people are the best fed among the nations of the world, and that 85% of the working population are busily engaged in the activities of agriculture, commerce and industry and that they are meeting with a fair share of prosperity, for this is evidenced in the savings banks of the country which are showing increased deposits from month to month. While our foreign trade has taken a tumble, this tumble has been no worse than other countries have experienced and we are still in quantity of shipments in excess of that of 1913. Considering then that we have passed through the greatest crisis in history, we have substantial hopes of steady improvement for 1922.

Preparations Being Made by Manufacturing Concerns

While some of the larger manufacturers are still curtailing advertising and sales help, the more progressive are preparing for even more emphasis along these lines in the year immediately ahead, particularly with reference to the newspapers, trade papers and popular magazines.

What Lines Should Be Emphasized

From a general study of the business situation in the eastern section of our country, in the Pacific Coast district and the Oriental and Japanese trade, it is apparent that the eastern section of our country might well devote emphasis to supplies and general lines rather than upon apparatus. Upon the Pacific Coast, on the other hand, the unabated activity in the hydroelectric development means that there

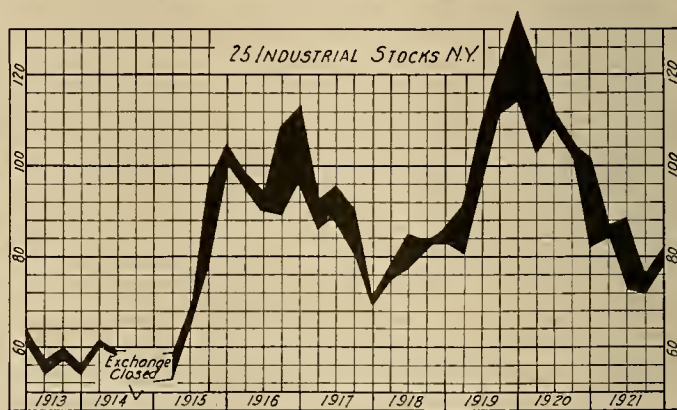
should be equal emphasis on all three groups, while in the Japanese and Oriental trade, attention to fundamentals such as hydroelectric construction, cement plants and the like will bring the greatest returns. Economists generally agree that December next should see business better by about 15%.

How New Extensions and New Construction Prospects Are Affected

The liquidation of business and smaller capital required for business operation today is resulting in the piling up of capital available in banks. This as a consequence has released funds for investment. The investment demand is not, however, largely for new construction and extensions, but rather for re-financing old projects. Until new projects and new extensions are undertaken, business generally cannot go forward and money still is scarce for these purposes. It is generally recognized that costs of labor and material are still believed to be unduly high and until these two factors can be better reconciled to the common level of business costs, the full resumption of new enterprises and new extensions can not be hoped for.

How More and Better Business May Be Brought About

There are indications of betterments in the business world, and the thoughts of the people must continually be turned to the constructive vision of how more and better business is to be obtained, if we are truly to usher in more prosperous conditions. A nation-wide drive is now on among all branches of the electrical industry to bring about this condition. Central station business the country over, exceeds that of this time a year ago on the average of 3% to 5%. While in general, the power sales have fallen off to a distressing extent, the peaks have increased. There is but one answer to this. Electrical appliances are producing a very important part of the demands



A chart showing the maximum and minimum quarterly fluctuations of 25 prominent industrial stocks listed on the New York exchange from 1913 through 1920. Note the violent fluctuations that have taken place in the industrial world during this war-torn period. It is to be noted that the stock market has recovered from the terrible upheaval at the end of 1919 and is today on a gradual upraise toward betterment.

of our central stations. This demand has come about because of the necessity for labor-saving appliances in the home. The tendency toward better conditions of living together with the better merchandising of electrical goods, advertising, real cooperation of interests of the producers, bankers, manufacturers,

electrical contractors and the press have greatly stimulated this recent increased use of electricity. So it is realized that one of the great factors in bettering business directly in the year 1922 must be accomplished by more intensive sales methods in which the needs of men and women in the home are studied and met.

As a consequence of all this, the major program of the National Electric Light Association this year is to be devoted to bringing into fruition the slogan "More and Better Business." Public utilities can today secure money at much less rates than in recent years and, too, more money is available.

After careful study of the different activities for new business that should be emphasized during the coming year, the following seem to be most desirable:

(1) Lighting—home, commercial, industrial, street and sign.

(2) Appliances—household, commercial.

(3) Industrial—heating, isolated plants, city, pumping, ice, refrigeration, and electric vehicles.

Some Specific Suggestions for New Business

Insofar as household and commercial lighting are concerned, people are staying at home now more than they have in the last few years and therefore use more light. In addition, the servant problem has made it possible to increase the use of electricity through the larger use of electric appliances. Since this situation has increased during the recent months there should be a larger sale of electric appliances. Indeed, tremendous national effort will unquestionably be made this year to introduce electricity into the home on a basis never before approached.

So far as commercial lighting is concerned, it can be pushed and much business secured. Factory business can also be pushed, as in many instances, where factories are running at all, improper illumination is the rule rather than the exception.

The development of industrial heating should be a good field, very material progress having been made during the war in the use of electric furnaces

and other similar devices. The use of these devices can be stimulated by central station activities.

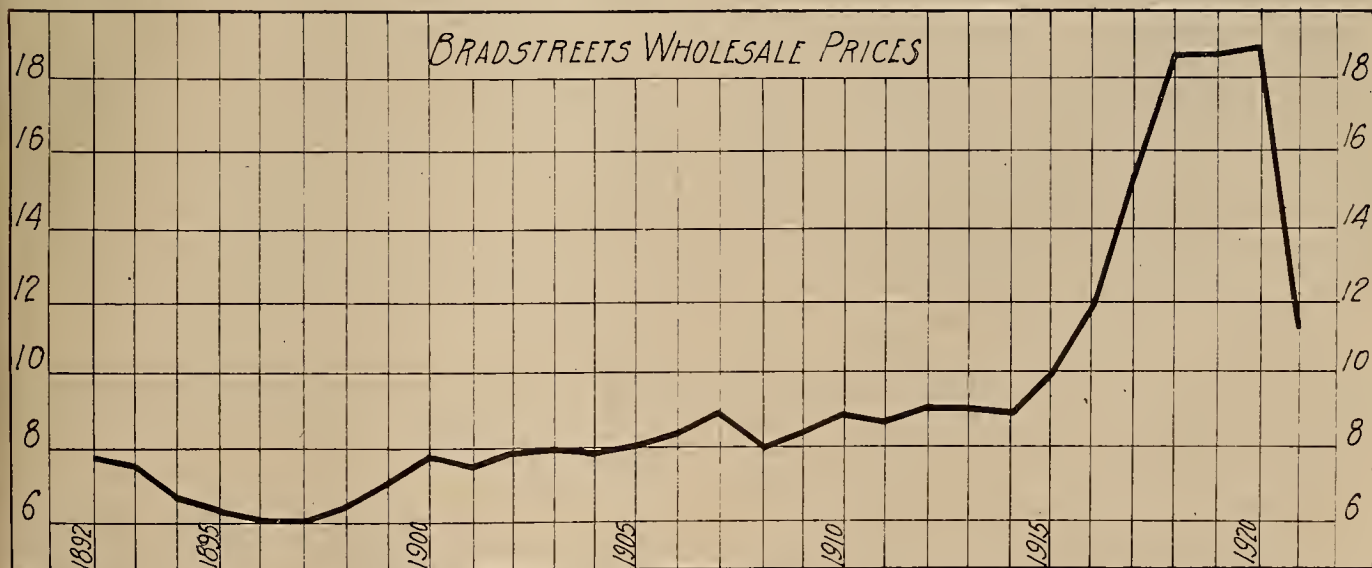
Where city pumping is not being done by the local central station company, this line can be taken up, as has already been done to a large extent in Chicago, where the greater proportion of the water



While checks cleared through the Federal Reserve Banks do not present an unimpeachable indication of the trend of conditions, still it is interesting to note that these clearings have fallen off during the last year and a half something like 25%, which in a way indicates the general trend in price reductions and total sales in business during this period. Note that cash sales are indicated and not volume sales under this method. It is doubtful if the actual volume sales have suffered anything like the reduction of business that such a chart as this would seem to indicate.

pumped into the city is done by power furnished by the central station company.

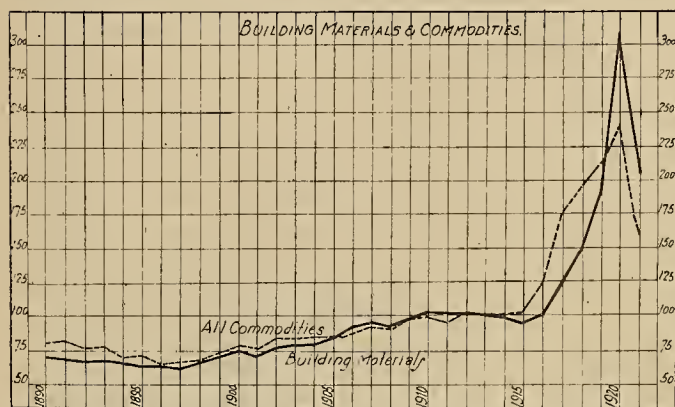
Refrigeration and ice making is another field where considerable progress has been made in some localities. Where ice is made by nature in the winter months, many people seem to think that the cutting of this ice, and its transportation, is cheaper than making it artificially. In any locality where the price per ton is lower for artificial ice than for that



Here is shown the general trend of wholesale prices as set forth by Bradstreet's. It will be seen that an average line connecting up these commodities from 1895 to date will show that the present wholesale price level is almost back to what would have been a normal increase were the war period not taken into consideration. Hence we may reasonably expect that 1922 will see no more violent reductions such as were so common during the earlier part of 1921.

frozen and transported in the winter months, artificial ice-making should be pushed, particularly this field exists in a broad area of the West where great shipments of fruit require ample refrigeration.

The stimulation of the use of electric vehicles for freight transportation and for industrial purposes, in warehouses, and also in some localities for passenger service, is a branch of the industry which



Here is set forth how the prices of building materials have varied with respect to the general prices of all commodities from 1890 down through 1921. Note that the end of 1920 saw building materials skyrocketing in price, while at the end of 1921 a violent reduction of some 50% had taken place. Yet even such a reduction has not been sufficient to bring building materials down to the level of all commodities.

has been sadly neglected, and emphasis laid on this activity by the central stations will bring good results.

There are many other instances of how new business can be gotten by studying the intensive methods that are under way in such districts as Denver where the cooperation of the banks has been effected in establishing the fact that electric appliances in the home are a great economy rather than a luxurious novelty, and where, although Denver is not an industrial city, the power salesmen are having no difficulty in holding existing power business and a recent contract has been closed for the supplying of power to a large ice manufacturer, and next summer will see Denver supplied for the first time with ice made by electric power.

Again, the emphasis of installations of irrigation plants up and down the Columbia River, the Northwest is showing new levels of activity in business of this sort. In fact, the intensive study of practically every central station district in the West reveals evident signs of a coming activity that means sales effort will be put forth during the coming year to a degree perhaps never before experienced, or at least not experienced for a half-dozen years past.

Markets Available in Western States

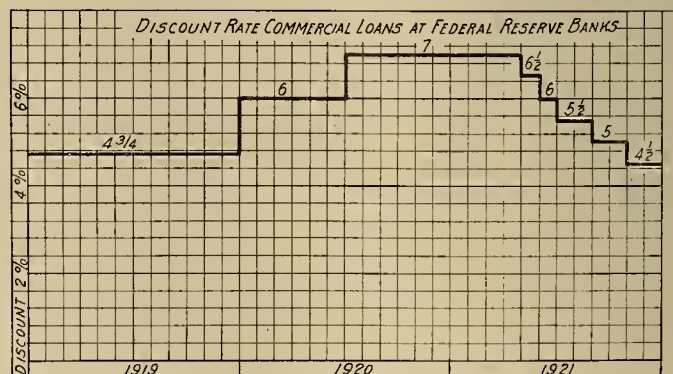
As great as was the prophecy of hydroelectric development in the issue of the Journal of Electricity and Western Industry for June 15, 1921, concerning the billion dollar program for the next ten years in the West, the construction work of recent months has even exceeded this figure. At the present time actual count shows that there are under construction for the 1922 schedule in the West 666,000 hp. in hydroelectric plants and some 60,000 hp. in steam power plants. There are also hydroelectric power

plants to the extent of 1,333,000 hp. whose major contracts are now being let. On the basis of \$400 per hp. total necessary expenditure for hydroelectric work and \$350 for steam electric work, it is seen that the program launched a year ago is proceeding at an even more promising rate than was anticipated.

What this means in dollars and cents to every citizen of the West may be gleaned from the following tabulation:

- 100,000 hp. installed in hydroelectric power plants means
- 60,000 customers served;
- means the employment of 1,300 people in the electrical industry with salaries paid to them of \$2,000,000 annually;
- means the use of 9,000 miles of wire, and the investment of \$37,500,000 in generating plants, transmission and distribution equipment;
- means the furnishing of electricity:
- for the electrification of 25,000 new homes, thus serving 100,000 persons;
- and for the operation of 240 miles of electric railways, representing \$27,600,000 of investment, employing 1,200 persons, carrying 45,000,000 passengers, and spending \$1,375,000 annually as operating expenses;
- and for the operation of mines and reduction plants, producing \$18,000,000 of minerals annually, employing 4,000 miners;
- and for the operation of 1,300 factories, representing \$100,000,000 of investment, employing 27,000 persons, and producing \$140,000,000 worth of goods annually;
- and for the irrigation of 125,000 acres of land, resulting in the expenditure of \$6,250,000 for improvements, producing \$9,500,000 worth of crops, and employing 5,000 farmers and laborers.

In highway construction there have been let major contracts to the extent of \$100,000,000, and contracts for street improvement work to the extent of \$100,000,000 for 1922. The home building and



A chart representing the discount rate on commercial loans at the Federal Reserve Banks for the past three years. It is to be observed that the present discount rate of 4 1/2% is lower than at any time during this period. This means that money is considerably easier to get and financing will proceed forward under more favorable conditions than have been experienced for some years.

general construction program is perhaps the most interesting of all in that this is proceeding with unusual emphasis throughout the West, particularly in the southwestern portion of the Pacific Coast. Estimates from the Federal Reserve Bank show that

this program is now totaling some \$400,000,000 per annum. Indeed, building permits of this extent have been let for immediate construction. In rough figures this may be divided as follows:

- 40% for commercial and general type of office buildings,
- 40% for residences, and
- 20% for industrial construction.

From this outlay of money that is immediately available for home building and business construction it is observable that markets in new home building are open during 1922 that have never existed before.

If now the program of emphasis on buildings already completed and electrically wired, be put through as outlined by the National Electric Light

the precept is now thoroughly recognized of "Live and help live" in every branch of electrical activities. All of our great centers of the West, such as Denver, Salt Lake City, Vancouver, Portland, San Francisco and Los Angeles are experiencing the good effects of these cooperative leagues. Then, too, there is perhaps the greatest of all factors, namely, the underlying desire to render an ever-increasing service to the public. This has found expression in the institution of such ideals as the "Greater Service" effort of the Southern California Edison Company where forty men are constantly engaged in going to and fro in the districts served to find out the status of the public mind, to help adjust complaints, and to earnestly seek to cultivate the good will of the community served.

Present Industrial and Power Growth in the West

While the growth in California in power sales shows about 41½% increase during the current year in industrial load and from 25% to 30% in general plant output, it is not believed that this situation has prevailed throughout the eleven western states. However, in the Northwest and Intermountain districts the slight revival in the mining industry is helpful, and the reduction in taxes, both state and federal, due to the pressure being brought to curtail public expenditures, have begun to have their effect. In the Spokane district, for instance, the federal taxes paid in 1921 actually showed a decrease as compared with 1920.

Conclusions on the 1922 Outlook

In conclusion, then, we would say for the season of 1922 that the West is now ready for enlarged sales activities. The buying power of the average customer during the coming year will be as great or greater than last year, and in many instances, due to a greater reduction in costs of living than in income, will be greater than during the years 1919 and 1920.

The general spirit of optimism for the future which is gaining ground among all classes of business is going to be helpful in developing greater sales of electricity to commercial uses, but on the other hand in many lines of commercial power sales increases will depend not so much upon what the central station attempts today as upon the improvement in business conditions applying to the industry, and these business conditions can be bettered by our studying the economic factors that go toward helping to improve economies in production, and these factors as we know are largely basically electrical. It is evident that the results desired can only be secured by the active cooperation of the entire industry, not only from the jobbers but from all other elements in industry itself, and I think if we go afield and assume leadership in the bettering of these economic factors, we shall find that more and better business will be ours in deed and in truth in 1922.

For much of the data portrayed on the charts as set forth in this discussion the author is greatly indebted to Professor David F. Jordan of New York University, author of the recent book entitled "Business Forecasting."



Here is a graphic representation setting forth the issuance of corporation securities in the United States from 1907 through 1921. It is interesting to learn that the last three years have far exceeded any former years in the history of America in the issuance of corporation securities. While much of this has been done for refinancing and liquidating old issues, the West, particularly, is seeing a substantial increase in new extension and new construction, due to large sums of money now being available for this work, which for 1922 may roughly be divided as follows: \$100,000,000 for new hydroelectric development, \$100,000,000 for highway construction, \$100,000,000 for street improvements and \$400,000,000 for new buildings, 20% of which is for new industrial construction, 40% for business and office buildings and 40% for new homes.

Association, the year 1922 bids well to exceed any previous year in the West as a market for electrical appliances of every nature, kind and form.

One Cloud that Darkens the Horizon

The one cloud that seems to darken the horizon of the West is the agitation in California over the proposed Water and Power Act, which will be an endeavor to sovietize California, in addition to embarking the state upon a \$500,000,000 expenditure in a time when business men generally agree to the motto that there should be "More Business in Government and less Government in Business."

Consumer Ownership Emphasis Helpful

The great encouraging factor, however, is that consumer ownership of power plant securities is more and more becoming widely distributed in the West and people by the tens of thousands are now being numbered among the holders of utility stocks, whereas a decade ago the number perhaps would be limited to the hundreds column.

Cooperative effort, too, is being felt in the West. Great optimism prevails, due to the fact that our industry as a whole is a united industry and one that is set to advance forward, due to the fact that

Review of the Agricultural Prospects in Western States

Despite the Fact that Agriculturists in General Have Suffered More from Price Declines than Any Other Comparable Group the Outlook for 1922 is Bright

By HENRY C. BRECK
Assistant Federal Reserve Agent
Federal Reserve Bank of San Francisco



IN a region where the general prosperity depends so largely upon conditions in agriculture as it does in the Twelfth Federal Reserve District, which includes the states of Arizona, California, Idaho, Nevada, Oregon, Washington and Utah, it is particularly informing at the opening of another year, to review the condition and prospects of the farmer. Notwithstanding such outstanding exceptions to the rule as the grape, lemon, and apple growers furnish, it

may be said that agriculturists generally have suffered more keenly during the past 18 months than any other comparable group in the population of this district. The crops of 1921 have been generally abundant, but the prices which they returned to growers were substantially less than the values received in 1920. A summary of the year's operations, with comparisons for 1920, appears in Table "I," from which the plight of the farmer is apparent.

It would be misleading, however, to conclude that the percentage figures in the last column of this table are a faithful measure of the farmer's actual condition and hence a reliable indication of the proximity of his recovery. The money which he received for his products was, it is true, far less than he received for his 1920 crop; but it is equally true that he paid considerably less in 1921 than he did in 1920 for the things which he consumed. Wholesale prices, at which the farmer sells his product, always decline

faster and farther than retail prices, which he pays for the things he buys. Hence the decrease in his cost of living has not been commensurate with the diminution in his income, but it has gone far to mitigate the severity of his diminution. The chart on the next page illustrates the extent to which the farmer's position in December, 1921, was less favorable than it was in 1913-1914, as it does also the extent to which he was better off in July, 1920, than before the war. He benefited when prices were ris-

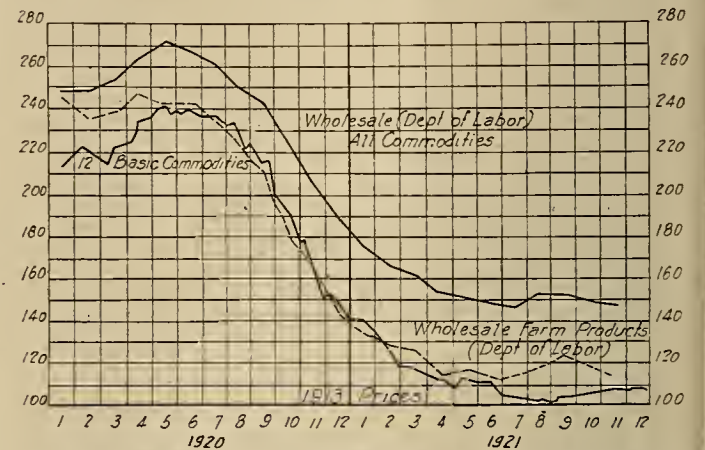


Chart I.—Movement of Wholesale Prices. Twelve basic commodities above are hides, cotton, wheat, corn, petroleum, pigiron, copper, lead, hogs, rubber, sugar and lumber.

ing and for several months after they began to fall, indeed until September, 1920. There is included also a table showing the latest figures published by the National Industrial Conference Board upon details of changes in living costs.

The three-line chart entitled "Movement of Wholesale Prices" illustrates the discrepancies between the extent of decrease in the wholesale price of all commodities, of farm products, and of a group of 12 basic raw materials only part of which are of

Table I.—Yield of and Prices Received for the Principal Farm Products of the Twelfth Federal Reserve District in 1921 and 1920.

CROP OR PRODUCT	Yield (000 omitted)		Average Price Received per Unit by Grower		Aggregate Return Received by Growers for their Crops (000 omitted)		Percentage of Decrease 1921 Compared with 1920
	1921	1920	1921	1920	1921	1920	
Wheat—All (bushels).....	122,045	100,232	\$0.84	\$1.378	\$102,531	\$138,156	25.7
Barley (bushels).....	39,148	41,134	.553	.985	21,652	40,540	46.6
Oats (bushels).....	34,343	44,398	.398	.714	13,682	31,724	56.8
Rice (bushels).....	5,880	9,720	1.15	1.21	6,762	11,761	42.5
Hay—All (tons).....	16,125	14,082	9.24	13.79	149,214	233,791	36.1
Cotton ¹ (pounds).....	54,453	130,000	.214	.30	11,690	39,000	70.0
Sugar Beets (tons).....	2,496	2,868	6.521	12.67	16,287	36,340	55.1
Beans (bushels).....	3,902	2,925	2.82	3.32	11,005	9,713	13.3 ²
Potatoes (bushels).....	35,371	39,445	1.022	1.074	36,179	42,361	14.6
Hops (pounds).....	28,560	36,630	.241	.350	6,885	12,821	46.3
Apples—Commercial Crop (barrels).....	11,761	7,379	3.769	3.686	44,333	27,193	63.0 ²
Peaches (bushels).....	14,781	15,188	1.114 ³	1.969 ⁴	16,467	29,912	44.9
Pears (bushels).....	5,821	6,568	1.581 ³	2.166 ⁴	9,209	14,229	35.2
Oranges (boxes).....	22,500	18,700	2.20	2.75	49,500	51,425	3.7
Lemons ⁵ (boxes).....	4,664	3,750	3.86	3.06	18,003	11,475	56.8 ¹

¹Includes Lower California Figures.

²Increase.

³December 1st.

⁴September 15th.

⁵November 15th.

⁶California Fruit Growers Exchange Figures. Prices F. O. B. California Packing House.

Table II.—Changes in the Cost of Living between July, 1914, and December, 1921
(National Industrial Conference Board)

I T E M	Relative Importance in Family Budget	Percentages of Increase in the Cost of Living above Average Prices in July, 1914, to—			Percentages of Decrease in Cost of Living on December 1, 1921, from Average Prices in—	
		July, 1920	November, 1921 ¹	December, 1921	July, 1920	November, 1921 ¹
Food.....	43.1	119	52	52 ²	30.6	(No Change)
Shelter.....	17.7	58	69	69	7.0 ³	(No Change)
Clothing.....	13.2	166	61	57	41.0	2.5
Fuel and Light.....	5.6	66	79	79	7.8 ³	(No Change)
(Fuel).....	(3.7)	(92)	(92)	(92)	(No Change)	(No Change)
(Light).....	(1.9)	(15)	(55)	(55)	(34.8) ³	(No Change)
Sundries.....	20.4	85	78	78	3.8	(No Change)
Weighted Average of All Items.....	100.0	104.5	63.0	62.7	20.4	0.2

¹Revised.
²Food Price figures are for the 15th of the preceding month, from the United States Bureau of Labor Statistics.
³Increase.

agricultural origin. It is highly suggestive when we turn from consideration of the present condition of the farmer to an appraisal of prospects for the year 1922. These are encouraging. Inspection of the chart discloses an unmistakable upward trend of prices for basic raw materials, amounting to approximately 8 per cent from the extreme low in August, 1920. Amelioration of the farmers' position through enhancement of his purchasing power will result from either (1) increasing prices for what he sells, (2) decreasing prices of what he buys, or (3) a combination of (2) and (3). Present indications are that the third, and of course the most rapid and effective of these tendencies, is likely to prevail in the coming months. Evidence is not wanting, indeed, to show that the agricultural communities have already "turned the corner." Borrowings of member banks from the Federal Reserve Bank of San Francisco are a trustworthy index of financial conditions in the communities which they serve. Chart III shows the course of borrowings during 1919, 1920, and 1921, of the city and country banks separately. It is noteworthy that during the whole of 1920 and the first 8 months of 1921,—a period when the country dis-

tricts generally experienced the severest pains of the readjustment period, the country banks steadily increased their borrowings from the reserve bank. In August of the current year, however, when returns from the sales of 1921 crops became available, these banks began to reduce their borrowings and they have since made consistent and rapid progress in this direction.

Other than purely financial evidence also suggests that the worst of the agricultural depression is past. There has been an increase of about 20 per cent in the price of wool since the first of August; livestock during the past month has been bringing noticeably higher prices at the principal markets of the district, the tendency of cotton prices was upward in the last three months of 1921, and hides have nearly doubled in price since April, 1921. Freight rates on grains, hay, fresh fruits, wool and other farm produces were lowered on January 1, 1922 for an experimental period of six months.

The War Finance Corporation has been an important factor in extending credit to many agriculturalists and livestock men whose needs could not be met by the use of six-months commercial credits

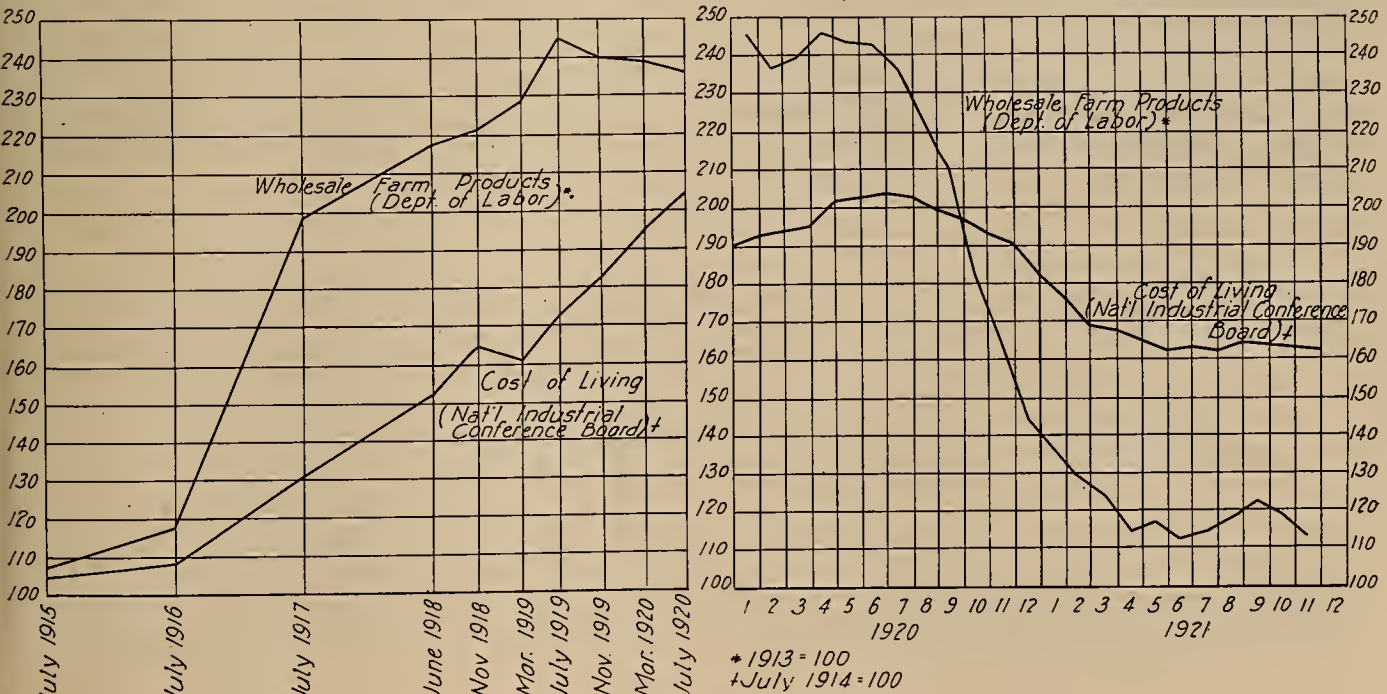


Chart II.—Wholesale Farm Prices and the Cost of Living

of the character declared eligible in the Federal Reserve Act for rediscount with the Federal Reserve Bank. Table III shows by states of this district and in summary form by commodities, the exact amount of credit assistance furnished by the War Finance

Table III.—Loans approved and Advances made by the War Finance Corporation in Twelfth Federal Reserve District to December 31, 1921.

CALIFORNIA		
Cooperative Canneries.....	Approved \$ 700,000	Advanced \$ 576,753
Prune and Apricot Growers Association.....	1,250,000	.....
Rice Growers.....	1,250,000	920,784
Livestock.....	827,185	483,279
	\$ 4,027,185	\$ 1,980,816
ARIZONA		
Cotton.....	\$ 1,200,000	\$ 581,591
Livestock.....	700,000	689,611
	\$ 1,900,000	\$ 1,271,202
NEVADA		
Livestock.....	\$ 248,000	\$ 248,000
OREGON		
Wheat.....	\$ 1,500,000	\$
Agriculture and Livestock.....	1,867,350	1,444,130
	\$ 3,367,350	\$ 1,444,130
WASHINGTON		
Wheat.....	\$ 6,000,000	\$ 781,137
Agriculture and Livestock.....	84,000	84,000
	\$ 6,084,000	\$ 865,137
IDAHO		
Wheat.....	\$ 1,500,000	\$ 537,653
Agriculture and Livestock.....	564,500	432,496
	\$ 2,064,500	\$ 970,149
UTAH		
Sugar.....	\$ 8,596,000	\$ 6,904,000
Agriculture and Livestock.....	1,219,755	329,043
	\$ 9,815,755	\$ 7,233,043
TOTAL.....	\$27,506,790	\$14,012,477
ARRANGED BY COMMODITIES		
Cooperative Canneries.....	\$ 700,000	\$ 576,753
Prune and Apricot Growers Association.....	1,250,000	.....
Rice.....	1,250,000	920,784
Cotton.....	1,200,000	581,591
Sugar.....	8,596,000	6,904,000
Wheat.....	9,000,000	1,318,790
Agriculture and Livestock.....	5,510,790	3,710,559
	\$27,506,790	\$14,012,477

Corporation in this Federal Reserve District up to December 31, 1921.

As in industry so in agriculture the amount of credit available for productive uses and its cost (i. e., the interest rate charged) are of vital importance. Examination of the condition of the Federal Reserve Bank of San Francisco and the reporting member

banks of this district at the end of December, 1921, as compared with the end of December, 1920, reveals at once the vast improvement in their condition during the past year and the abundance of credit available for the coming year whenever legitimate agricultural or industrial opportunities for its employment are afforded. The essential items in the condition of the reporting member banks and the Federal Reserve Bank appear in the following brief tabulation.

Table IV.—Reporting Member Banks—Twelfth Federal Reserve District

		(In Thousands of Dollars)		Per Cent Increase or Decrease in 1921
		December 28, 1921	December 31, 1920	
Number of Reporting Banks.....	64	66		
1. Total Deposits (excluding Govt.).....	\$1,166,596	\$1,143,769		+1.5
2. Total Loans and Discounts and Investments (excluding rediscounts).....	1,227,607	1,201,468		+2.2
3. Cash (in Vault and with Federal Reserve Bank).....	79,662	104,735		-23.9
4. Total Borrowings from Federal Reserve Bank.....	34,229	108,470		-68.4
Federal Reserve Bank of San Francisco				
		(In Thousands of Dollars)		Per Cent Increase or Decrease in 1921
		December 28, 1921	December 30, 1920	
1. Total Reserves.....	\$283,758	\$187,717		+51.2
2. Loans and Discounts.....	92,084	211,953		-56.5
3. Investments.....	10,680	13,724		-22.2
4. Federal Reserve Note Circulation.....	244,252	270,745		-9.8
5. Reserve Percentage.....	76.8	51.1		+25.7

Not only is credit in adequate, indeed abundant, supply, but rates of interest are substantially lower. The Federal Reserve Bank of San Francisco now rediscounts all classes of paper at 5 per cent compared with 6 per cent in January, 1921, and the rates of interest reported as customary by the principal city banks of the district, show a comparable decline.

Predictions of 1922 crop yields at this early day are but little better than guesses. The season has been favorable to date, however, and there is no cause for anticipating other than normal yields. If basic raw materials continue their present upward price movement, these crops should bring returns to the growers in excess of the past seasons' figures, and with production costs, including the cost of bank credit, tending to decline, as well as the cost of living, the 1922 outlook in this district for agriculture and hence for much of the business and industrial community is bright.

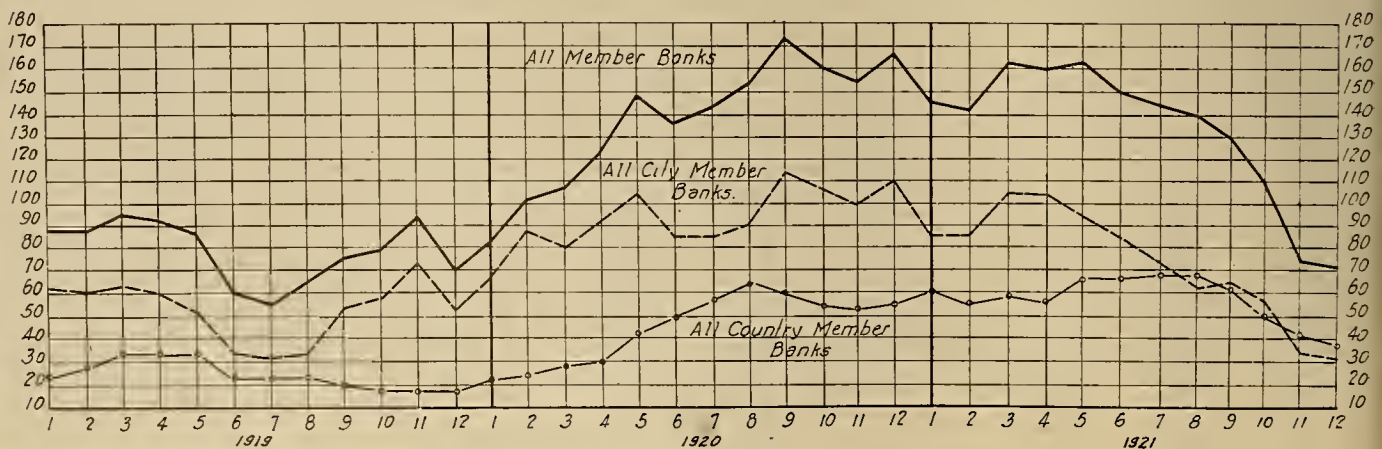


Chart III.—Comparative Chart of Rediscount Operations for Three Years 1919-1921 (in millions of dollars). City banks include all member banks in San Francisco, Los Angeles, Portland, Seattle, Spokane and Salt Lake City. Country banks include all other member banks.

Prospects For 1922 Indicate Improvement in Lumber Market

Analysis of the Timber Supplies of the Nation Shows that Western Forests Which Are Present Timber Reserves Will Furnish the Bulk of the Lumber Marketed During the Next Fifty Years

By DAVID T. MASON
Forest Engineer, Portland, Oregon



THE history of the lumber industry in the United States shows a movement of the center of production from one forest region to another with the growth of the population of the country and with the depletion of the timber resources of the various regions. The industry was first of greatest importance in the Northeastern States which were the main producers from colonial days until 1870. Before 1880 the Lake States became the most important producing region, and for two decades furnished approximately 35 per cent of the lumber needs of the country. By about 1900 the Lake States had fallen off in production and the Gulf States had increased their production until the two regions were each furnishing approximately 25 per cent of the country's needs. At this time the Western States were furnishing only about 10 per cent. By 1910 the Lake States had sunk to minor importance and were succeeded by the Gulf States as the leading producers; from 1910 until 1920 the Gulf States furnished approximately 35 per cent of the product. After 1900 the cut in the Western States increased rapidly until at the present time it is just about equal to that of the Gulf States, which have passed the zenith of their production and from now on will decline in importance in the per cent of lumber which they furnish to the country's markets. On the other hand the West, which already equals the South in producing about 35 per cent of the lumber, will continue to increase its output for a number of years.

Western States Future Producers

The Western States will become more and more prominent lumber producers because the timber supplies of the part of the United States east of the Rocky Mountains are all heavily depleted, while the western supplies constitute the great timber reserve of the nation. About 20 per cent of the remaining soft wood timber is in the East while approximately 80 per cent is found in or west of the Rocky Mountains. The location of western timber and western logging operations is of some interest. The Douglas fir region of western Oregon and western Washington between the ocean and the summits of the Cascades has approximately 700 billion feet of standing timber and is annually cutting about 9 billion feet.

The Inland Empire which includes the water shed of the Columbia River east of the Cascade range in the states of Oregon, Washington, Idaho, and Montana, has slightly more than 300 billion feet of timber and is cutting approximately 1.5 billion feet annually. California has slightly less than 300 billion feet of timber and cuts approximately 1.25 billion feet annually.

Western Timber Supplies

At the present rate of cutting the virgin timber supply of the West would last for about 100 years. However, as the timber supply in other regions of the United States becomes exhausted it is anticipated that the country will continue to draw heavily on western forests and that the increased cut in the West will be such as practically to exhaust the western supplies of virgin timber in about 50 years. The rate of cutting has within the last few years increased materially in the Douglas fir region but not much in the other regions of the West. It is believed that it will continue to increase steadily in the fir region and that also there will be a considerable increase in the output of the California pine region within the next few years.

It is of interest to note that within the past two or three years a number of the most important Gulf States operators have become heavily interested in western timber and in western lumber manufacturing. No doubt other southern operators will come west as their present supplies of timber are exhausted, for this has always happened when the center of production of the industry has moved from one region to another in the past.

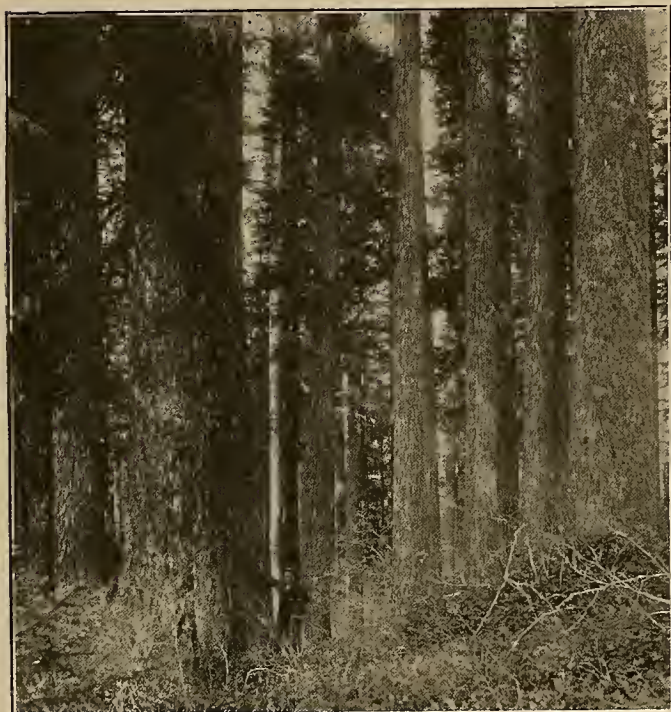
The lumber industry of the West has been more or less seriously influenced in a number of ways in the recent past. Two years ago the prices and demand were the highest ever experienced. Before the end of 1920, however, the demand had greatly diminished and prices had dropped below cost for much of the lumber. During 1921 conditions in the industry improved, but are still below normal in many parts of the West.

Conditions During Past Year

The increase in railroad freight rates on all commodities made in the summer of 1920 has adversely affected the lumber of the West as compared with that of the South, for the percentage increase was applied to widely different rates—that of the South being much lower, of course, to the principal points of lumber consumption in the Mississippi Valley and on the North Atlantic Coast. This rate increase on account of the manner in which it was

made gave the southern pine operators an additional advantage over the western operators by from \$2 to \$3 per thousand feet of lumber.

A large share of the lumber production of the country is consumed on the farm. The exceedingly serious condition of the farmer recently has greatly curtailed the consumption of lumber on the farm. This situation has been of much more importance to the pine mills of the Inland Empire than to the tide-water mills in the fir and the redwood regions, for the exceedingly rapid development of southern California in the past year or two has increased its lumber consumption to approximately a billion feet, thus helping to maintain an outlet for those mills which are able to ship by water.



A typical virgin forest of the Northwest. The Douglas fir region of Oregon and Washington, between the Pacific and the summit of the Cascades, has approximately seven hundred billion feet of standing timber, which is now being cut at the rate of nine billion feet annually. It is estimated that the western timber will last about fifty years.

The increase of rail rates and the decrease of water rates have enormously increased lumber shipments to the East Coast by way of the Panama Canal during the past year. During 1920 approximately 15 million feet of lumber was sent from the West Coast to the East Coast through the Canal. During 1921 such shipments probably amounted to something like 175 million feet. A further great expansion of this business is anticipated.

Improvement During Past Year

During 1921, as compared with 1920, the export of lumber from the West Coast increased greatly to Japan, the Philippines, Egypt, India and New Zealand; it decreased greatly to Europe, South America, Africa, Cuba, China and Australia. The water shipments for 1921 have probably been slightly greater than those of 1920. Water shipments would have been still larger but for the seamen's strike last

spring. The total water shipments from the West Coast for 1921 probably amount to approximately 1.6 billion feet, the final figures not having been compiled at this writing. About half of this total is coastwise traffic to California ports.

Normally about 85 per cent of the lumber production of the West is marketed by rail shipments; and it is the rail business which has been especially hard-hit in the year of depression through which we have just passed. On the basis of the most recent reports from the various regions it is estimated that rail shipments during 1921 were only about 60 per cent of normal. All shipments, water and rail combined, were about two-thirds normal.

Among the important developments in the industry recently is the continued application of electric power both in logging and in sawmill operations. As electric power is developed and made available on a larger scale in the West no doubt the industry will use it more and more.

Another interesting recent development is found in the announcement of three California redwood companies that they plan to manage their timber properties for the perpetual production of crops of timber, the object being a permanent supply of raw material for their manufacturing plants. Several other redwood companies are making a careful study of the possibilities of permanent forest management on their lands. Some of the latter also will probably adopt in the near future a permanent forest management policy. It is believed that a number of the operators in the Douglas fir and California pine regions will eventually do the same thing. The enormous increase in population which is sure to take place on the West coast during the next fifty years and the rapid depletion of virgin timber supplies throughout North America are certain to provide good markets for those who have second growth timber ready for cutting during the last half of the present century.

Prospects for Coming Year

The demand for lumber has increased considerably recently. The prospects for 1922 in the lumber industry appear to indicate a considerable improvement in the market. Although the farmer is still in bad condition, the fundamental situation remains that the country has failed for the past five years to do a normal amount of building. The shortage in the use of lumber amounts to many billion feet. Furthermore, there is a shortage of stock in the hands of retail lumbermen. It appears likely, therefore, that the next year will see a steady improvement in the lumber market situation. This is decidedly important to the West for to a greater extent than is commonly realized the prosperity of the West is tied up with the lumber industry which is the principal activity of northern California, western Oregon, western Washington, northern Idaho and western Montana, giving employment to many men and consuming large quantities of supplies of various sorts.

Prospects of Canning Industry are Brighter than Last Year

Although Volume of Future Orders for Canned Fruits is Based on Eastern Crops, Conditions Appear Favorable for the Marketing of a Normal Pack During the Coming Year

By ELMER E. CHASE
President, Cannery League of California

ABOUT one hundred and ten years ago Nicolas Appert of Chalons-sur-Marne, France, developed the art of preserving various types of perishable foods through the use of heat and hermetically sealed containers. This was the beginning of the canning industry. The progress, however, since that date was very slow until scientists about 1890 became interested in the subject and succeeded in solving many canning problems. Since 1890 its growth has been phenomenal.

Electricity has played its full part in the development of the industry during the last decade, as it has made it possible to practically eliminate overhead shafting, pulleys and belts and has permitted the connecting up of machinery in units which is a much more dependable, economical, sanitary and efficient manner. There is less machinery used in fruit canning operations, however, than in canning other products due to the fact that most of the work must be done by hand since the quality of the fruit is not determined so much by size as it is by color, flavor, texture, symmetry and other factors that are of the utmost importance in establishing the grades.

West Great Canning Center

The Western states, particularly California, have become the great fruit canning center of the world and we are now producing most of the canned fruits that go to supply the tables of our own people and in addition we are exporting quite a percentage of our pack. During the past ten years, the output of canned fruits in California has more than doubled and the combined average annual output of canned fruits and vegetables would pave a solid pathway from San Francisco to New York about two feet in width.

The most expensive pack of canned fruits since the industry was placed on a commercial basis was made in the season of 1920. During that season the highest known prices were paid for fruits, sugar, boxes and labor. In June, when prices are normally made, in spite of the fact that they were above anything in the history of the business, there was a very good market and excellent prospects of selling out the entire pack at a fair margin of profit. But in August sugar started on the toboggan and prices rapidly fell, until in a few weeks sugar was worth only about 40% of its former value. Many other items of merchandise, particularly coffee, tea, rice, spices and canned fruits were carried down with sugar. The result was that only about 70% of the 1920 pack had been sold by the end of the year and January 1st, 1921, found the canners facing a very serious situation as they were holding 30% of the 1920 output with no market in sight. It was

realized that severe reductions would have to be made in prices if these goods were to pass into the hands of the consumer before the 1921 pack was placed on the market.

The total pack of canned fruits in 1920 in the states of California, Washington, Oregon and Idaho was in excess of thirteen million cases. In February it was estimated that there was a carryover of 3,066,871 cases out of a total of 11,382,863 cases in California.

Due to a moral obligation to protect the wholesalers who had purchased the bulk of the 1920 pack at extremely high prices, no attempts at liquidation were made until well into the spring months of 1921 when canners started to liquidate their holdings and found it necessary, in order to do this, to cut the price of canned fruits about 50 per cent. As it turned out, this was probably the best move that could have been made, for it resulted in attracting the attention of wholesalers, retailers and consumers to such an extent that the 1920 carryover had largely moved into consuming channels before prices were named on the 1921 pack.

Frost Damage to Eastern Crops

Fortune further favored western canners through the heavy damage done to the eastern fruit crops by frost, and this made it possible during the past year to not only clean up the 1920 carryover, but also to place the bulk of the new pack at fairly good prices. It is estimated that the present carryover on canned fruits is about normal, which means that it is very much less than the carryover of one year ago.

The prospects for the coming season are very good, as it is very evident that stocks of canned fruits in the hands of the trade are much lighter than usual at this time of year. If costs of supplies for the coming season are reasonable it will mean that 1922 canned fruit prices will be closely in line with present prices and this will undoubtedly give us a market for a normal pack in 1922.

In my opinion, it would be fatal to the merchandising of our canned fruits if prices were increased much above the present level. It is going to depend very largely on the eastern fruit crops as to the volume of future orders that will be placed by wholesalers during the coming season.

Since 1920 and the fore part of 1921 is a period everyone having anything to do with canned fruits will be glad to forget as far as possible, and with the knowledge that we are now on a normal basis canners are happy in the thought that they can look forward in 1922 to a much brighter prospect than was evident a year ago.

Review of the California Oil Industry During Past Year

Due to the Development of Fields in the Vicinity of Huntington Beach and Elk Hills, Oil Production During 1921 Has Exceeded Any Previous Twelve Months Period

By WALTER STALDER
Consulting Geologist



Oil production in California during the year 1921 exceeded that of any previous twelve months since the discovery of this substance in the state. Exact data for the month of December are not available at this early writing and an estimate of that one month's production has been made. Conservatively, this estimate will place the production for

the year at between 113 million and 114 million barrels. These figures would have been considerably higher but for the interruption of production by an oil workers' strike in the San Joaquin valley and in some of the coast fields during the early fall. All of these conditions are revealed in the curves which accompany this summary.

The cause for the increase in production is attributable mainly to developments in the Elk Hills and in the Huntington Beach districts. In the former the exploitation of privately owned lands within the boundaries of Naval Reserve No. 1 led to the usual offset wells on adjacent privately owned lands and on lands leased from the United States government by competitive bidding. In the Huntington Beach field production was increased by intensive drilling along a hidden fold in which town lot drilling was a feature. Toward the close of the year the Signal Hill district to the northwest of the Huntington Beach field and in the north part of the town of Long Beach came in and also the new district near Santa Fe Springs on another hidden structure. All of these later fields are in Los Angeles county. Both the Signal Hill and the Santa Fe Springs areas will doubtless show their importance one year hence when the production of 1922 is recorded.

Supply and Demand Control Production

The accompanying curves when studied in connection with the history of the oil industry in California reveal some very important facts. One of these is that the field price of oil has not been made by manipulation in the past but its increase or decrease is really controlled by supply and demand. It is noted that when oil stocks have increased prices have decreased and conversely when stocks have decreased prices have increased. Another interesting condition is the comparatively low price of oil from the beginning of the curves up to the war period of 1916. This period of low prices and over-production

while a hardship to the operators nevertheless educated them to the difficulties of all phases of the industry from prospecting to marketing and protecting themselves, legally and even politically when necessary. The existence of these hardships has resulted to the good of the state in so far as only those best fitted for the industry have survived, that operations have been carefully carried on, that higher and more economical uses and methods have been developed, that excessive production with its corresponding disadvantages has largely been avoided and during the period of very low prices in the mid-continent and Rocky Mountain districts,



The discovery of oil in the Elk Hills district added materially to the production of petroleum in California. The view above is Tupman wells of the Standard Oil Company.

during the year just passed, great over-production in California has so far been absent.

Such over-production has also been retarded in the past in an indirect manner through litigation in connection with government lands, the operation of properties by government receivers, and the lack of a workable oil land leasing bill. The clearing away of litigation in regard to certain government lands and the acceptance of leases by many of the claimants rather than a further legal contest is resulting in increased developments. Where the government receiverships have been dissolved and properties returned to regular oil field management new developments and increased production will undoubtedly again result. The oil land leasing bill which is now in operation has opened the way to new prospecting and to initial developments in new as well as in already proven districts. Many of these new ventures will be failures but those that are successful will certainly add new districts to the state.

Although a strange anomaly, we now find the United States Government actually in the oil land leasing business in connection with properties that all through the war period were reserved for future



A section of the Huntington Beach oil wells where the derricks rise among the bungalows. (Courtesy Standard Oil Bulletin.)

fuel oil for the United States navy. As previously mentioned, private developments on adjoining lands has seemingly made this necessary. For the future conservative control of the industry as well as a future fuel supply for the navy the effect of this policy will be important to watch.

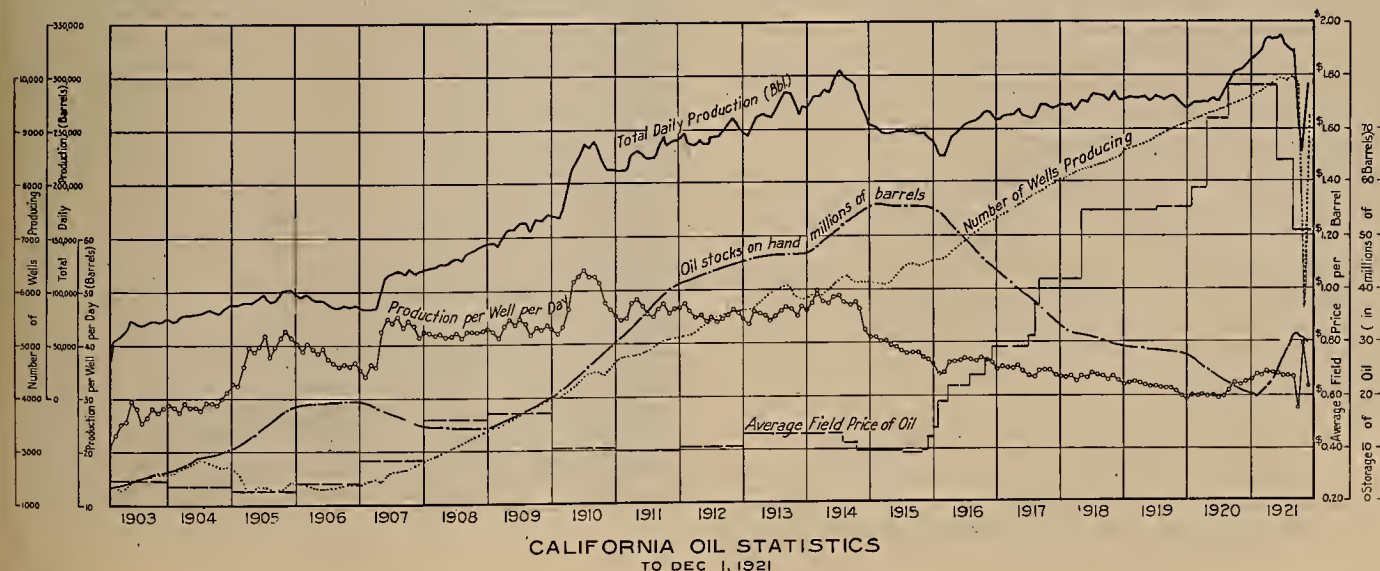
To the operator who in the past has learned what excessive over-production really means the almost simultaneous removal of many of the hindrances to production by enactment of the oil land leasing bill, the cessation of government litigation in regard to many claims for public lands developed under the old placer mining law and later withdrawn from entry, as well as the beginning of development on government holdings within the Naval Reserves, will shortly have a very important effect on oil production in California, its markets and its prices. Some of the increased production for the year 1921 is attributable to these causes.

Attempt at Political Control

An important event to the California oil industry as well as to the country at large was the defeat of certain proposed legislation within the state which would declare the oil industry a public utility and place it under the control of the state railroad commission. The principal contention of the sponsors for such bills was that the prices of oil and the products thereof were manipulated to the disadvantage of the consumer. A presentation of the facts, some

of which are revealed by the accompanying curves, convinced the legislature that such legislation was not necessary or proper. Had such legislation been passed it would have had its effect on future production and oil prices and it is questionable if such political control would ever benefit either the producer or the consumer.

The oil strike which caused a sharp decrease in production during the two months that it lasted was called on September 10, 1921, by the oil workers under the leadership of an advisor who was not experienced in the oil business. This strike was not called because of any misunderstanding relating to wages or working conditions, but because of a refusal on the part of certain operators to acquiesce to the continuance of war-time government arbitration in any dispute that might arise in the future. The strike did not affect some of the largest operators, but others it did and was applied principally to the San Joaquin valley and some, but not all, of the coast fields. From the standpoint of success to the union men this strike was ill-timed in so far as a curtailment of production at this particular period was a decided advantage to the industry for, as will be noted on the curves, oil stocks were rapidly mounting and the resultant over-production would shortly cause demoralized markets. The idle wells, resulting from the strike, most of which were the poorest producers, served to offset this over-production dur-



ing the period that it lasted. Had it continued longer it would have resulted in drawing more storage oil and would have made room for stocks that are daily increasing at the present time.

From the standpoint of the oil operators this issue had to be settled some time and the sooner solved the better. It died out two months after being called and what is known as the American plan wherein the operators "hire and fire" whom they will is in operation.

To those who have been pessimistic in the past regarding the future possibilities of California production, the development of new districts in Los Angeles county, some of which are on hidden structures, must have been considerable of a surprise. In the past California has always produced sufficient oil to supply her markets and whenever called upon has been able to more than meet any emergency, even the great draft on her resources occasioned by the war. During the last seven years the Montebello, Richfield, Huntington Beach, Signal Hill, Santa Fe Springs and Elk Hills oil districts have been brought in. These fields are already causing some concern on the part of those vitally interested in the

industry because of the rapidly increasing storage. There is good reason to believe that beneath the San Joaquin valley around the margin of which some of the most prolific oil fields have been found, hidden structures may exist. Should new and hidden fields be found by drilling in this wide expanse it will considerably swell future production. There are other possibilities in organic shale and other sedimentary areas in the coast districts from San Francisco south. What northern California, particularly about the Sacramento river drainage in the sedimentary areas, may bring forth is not known. When market conditions require the development of new fields there is a vast amount of territory to be tested in this state. The easily discovered fields have been mostly developed and prospecting in the future will be more venturesome. It is with knowledge of past developments and a realization of some of these future possibilities that there is good ground to state that the true potential of California is not known other than that it is extremely large and it is idle to endeavor to estimate either ten, fifteen, forty, or any other number of years as the future life of the industry in this state.

Metallic Sodium Formed in Sea Water

Charged Wire Used for Welding Exposed to Washing of Tide Forms Metallic Sodium From Crust of Sea Salt

By EDWIN ROEDEL
Chemist, Bethlehem Shipbuilding Corp.

WHAT a flood of "It can't be done"s will greet the assertion that under the wharves of the Bethlehem Shipbuilding Corporation metallic sodium has been formed in the presence of sea water. A wire carrying a current of 700 volts for electric welding was bared of insulation at one point under the wharves where it was exposed to alternate washing by the tide, and subject to moistening by capillary attraction. The power house soon discovered a "leak" of some 125 amperes and in searching for it found a growth of about 8 in. in diameter, as shown in the accompanying cut, around the non-insulated point on the wire. A workman was sent to chip off the "barnacle," but when attacked with a chisel it spit back fire and caustic, burning the workman's hands and bursting into flames as it fell in the water. It was then that the chemistry department was appealed to for an explanation.

A huge chunk of the sample was delivered to the chemistry department, a cross-section of which showed a very heterogeneous composite thickly pocketed with deposits of light colored metallic sodium. An analysis was made of a sample taken at random, with the following results, the amount of sodium being calculated from the hydrogen evolved when dissolved in water:

Sodium	29.3%
Sodium Hydroxide	58.5%
Sea salt, by difference.....	12.2%

In seeking for an explanation for the formation of metallic sodium in the presence of moisture, the following hypothesis was evolved. The heated wire

must have evaporated the water reaching it through capillary attraction or otherwise, and formed a gradually thickening crust of sea salt, sufficiently moistened to form a good electrolyte. The sodium formed was undoubtedly partially decomposed at first, but the continuous evolution of hydrogen and the incrustation of caustic and salt prevented with increasing effectiveness the access of water, thus accelerating the "growth" as the deposit thickened, and perhaps even reconverting some of the caustic to sodium. In any event, the phenomena should be one of interest to engineers, as well as chemists.

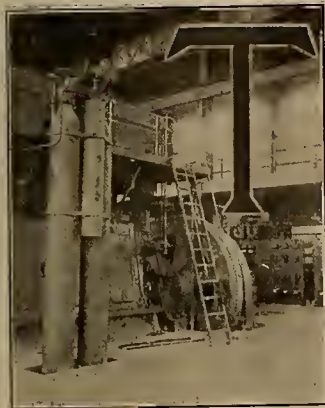


A section of the "barnacle" eight inches in diameter which is composed largely of metallic sodium. How the sodium was formed in the presence of moisture is explained in the accompanying article.

Western Mining Operations are Definitely on the Upgrade

General Improvement in Economic Conditions Will Result in Increased Demand for Base Metals, Notably Copper, Causing a Resumption of General Mining Activities

By FRANK L. SIZER
Mining Engineer



THE optimism of the miner is proverbial. If it were not strong in the heart of every man engaged in the winning of metal from the ground, there would be a much smaller number engaged in the occupation of digging and reducing the common ores found in the mining field. We all know how the hope of striking pay in the

next round of holes has sustained many a prospector and made him ignore privations, year after year, serenely confident that there are better days ahead. In the same way, in a larger degree, mining companies often continue their operations beyond the point where good judgment dictates and risk a year's loss, rather than to shut down entirely, lose a good organization and later make a fresh start under conditions made more difficult by new problems. This has been the situation in which many mining companies found themselves during the past two years and 1921 has been a particularly discouraging year. I have been asked many times, whether it is a reasonable hope that 1922 will be a better year for the mining industry, and I have answered, "Yes, it must be better for I do not see how it can be worse!"

Many circumstances have combined to force continued hardships upon the mine operators and the recovery from conditions, which were the natural consequence of the war, has been tedious, so slow in some cases as to be imperceptible. Beginning with 1919 we had hopes of relief from the labor shortage which, borne patiently by all through the war period, we had a right to expect would make a quick change for the better soon after demobilization. Then came strikes and demands of the unions, in many cases difficult to settle quickly and amicably. During the war we were compelled to put up with inefficient mining labor, not only because men would not do a fair day's work but for the additional reason that men were taken from other occupations and placed in the mines, and their training was at the expense of the operator. This resulted in increasing the cost of production, already much higher because of the rise in the price of all supplies necessary in the industry, until the total cost became prohibitive. Only those mines which could better afford to run on a limited scale, rather than to shut down entirely and pay a heavy cost for idle maintenance, continued in operation, hoping against hope that some radical change in the controlling factors of cost would enable

them to tide over the most unfavorable period in mining that has been known in the past ten years. In the fall of 1920 came the concerted action of all the big copper mines, when a suspension of production was admittedly the only means of saving the industry from total collapse. The smaller copper mines had already been obliged to suspend. The closing of many custom smelters was the last straw, not unexpected but inevitable. In many cases the suspension of mining had pretty nearly destroyed the life of what had been flourishing communities. The steady reduction of the copper surplus has been a hopeful sign and now with extensive plans for hydro-electric development in many localities, notably the Colorado River, and the distribution of the electric current over a radius of five hundred miles, there is a practical certainty that by the middle of 1922 we shall see all of the copper mines in operation again. The absorption of American Brass Co. by the Anaconda Mining Co. is evidence of a plan on the part of one of our largest copper producers to make certain its own domestic market, since we are advised in print that the metal requirements of the American Brass Co. are greater than all the copper which Anaconda can produce. In a similar manner, it is not unlikely that the copper producers of Arizona will, in the near future, equip and operate mills to produce the finished products in brass and copper, particularly after the assurance of cheap and unlimited power which will be available from the Colorado River project. These plans, including the distribution as well as the installation requirements of so vast a project as that on the Colorado River, insure a much larger domestic consumption of copper in the next ten years and we are therefore less concerned about the export demands, which naturally have been slow in reaching a pre-war basis, by reason of the abnormal rate of exchange and the disturbed condition of all Europe.

Now we are told by all financiers that business conditions are better, that the year 1922 has a brighter outlook and that we are already on the upgrade, with prosperity in sight. Admitting that this is so, the conclusion is inevitable that the base metals, and notably copper, will be in such demand as to make certain the resumption of all mining and smelting companies before the end of the year. My answer, therefore, to the question, "Is mining on the improve?" is logically "Yes," without any possibility of a reactionary movement and with a reasonably stable price for the metals.

In the case of precious metals, the situation is a little different. So long as the price of one dollar per ounce for silver is maintained and with the growing demand for gold and platinum in the arts, we

need have no fear but that mine operators will meet it; in fact the report is already in hand, advising us of the increase in gold production in California for the year 1921. A statement made recently by a prominent mining engineer who is in close touch with large scale operations, is that the decrease in cost of mine labor in the past year has been from 12

to 15 per cent and that mining supplies generally have decreased 20 per cent. This furnishes encouragement for new mining enterprises and, in my own range of observation, there is more disposition to give serious consideration to all sound mining projects, planning future expansion rather than retrenchment.

Better Conditions Ahead for the California Cattle Industry

Improved Financial Conditions as a Result of Liquidation, Prospects of Abundant Feed for the Coming Year, and Improved Labor Conditions Will Benefit Cattlemen

By R. M. HAGEN

Secretary, California Cattlemen's Association

CALIFORNIA cattlemen have been exceedingly fortunate during the past year, compared with cattlemen in other parts of the United States. Not only have feed conditions been exceedingly good throughout the season, but the price received for cattle has been comparatively higher in California than at other points. In addition to this, financial conditions have been better in California than at almost any other point in the United States. True, not all cattlemen have been completely satisfied with the condition of affairs, that is only human nature and to be expected. In general, however, the cattleman who has been in the business for a number of years and who is expecting to stay in during the years to come, finds himself in good condition and quite well satisfied with his receipts for the past year.

The exceedingly dry fall has caused a shortage of feed in some parts of the state, but no serious conditions have developed. The rains during the month of December have again insured a successful feeding year for 1922, and with improving financial and labor conditions and a return to active business conditions in other lines, the cattleman has a bright future ahead of him.

The supply of cattle in California is still showing a shortage, and while normally everyone is fully supplied with both feeder and stocker cattle at this season of the year, there still remains a strong demand for both classes of stock. This shortage of cattle exists not only in California, but also in adjoining states. Nevada is not feeding as many cattle as usual this winter as is also true in the case of Utah. Arizona and New Mexico also report a shortage of cattle, while the states to the north of California have abundant feed and find it necessary to bring in some Canadian cattle, in spite of the tariff, in order to consume the feed on hand.

The financial situation seems to have crippled the livestock industry in the middle west and intermountain states, particularly in Idaho. Strenuous efforts are being made to relieve the situation there by the War Finance Corporation cooperating with the loan companies. This is very gratifying to the California cattleman, for if the financial condition of the stockraisers in these states were not taken care of, there would be great danger of a surplus of

cattle being shipped into the California markets from that section. At present there seems to be no immediate danger of such an unfortunate thing happening. It appears that plans will be carried out for the proper financing of the livestock industry and that it will not be necessary to further sacrifice young cattle and breeding stock because of lack of sufficient funds. This is most fortunate, because a further depletion of the breeding stock and calves would decrease the available beef supply for the coming few years, which would ultimately result in the increased price of beef to the consumer.

The California Cattlemen's Association is aiding the cattlemen of California in many ways during the present readjustment period. The state office, located in San Francisco, acts as a clearing house for information and service to the several thousand members of the Association. A weekly market bulletin is sent to every member of the Association; cattlemen are assisted with transportation problems, are assisted in securing feed, feeder or stock cattle; as well as in their financial difficulties which are being relieved by the War Finance Corporation.

The cattle industry at the present time is going through a period of readjustment that works hardships on those individuals who are not established on a sound basis. Hard work, the adoption of better business policies, and economical production, are the things that will put the industry on a sound and profitable basis in a comparatively short time. The cheerful side of the picture is that the livestock industry probably reached a condition of 100 per cent liquidation sooner than almost any other industry. That being the case, the rebound will begin that much sooner and a normal condition will be attained before the other industries reach that enviable condition. This very fact is being more and more realized by the banks of the state. They are taking the position that since 100 per cent liquidation has been accomplished in the livestock industry, cattle paper is therefore on a sound basis, and is one of the best securities which can be taken at the present time. The result is that more and more much needed long-time credit is being extended to cattlemen in order to carry their depleted breeding herds and young stock, that their herds may be rebuilt to normal size and quality.

Manufacturing Load Shows Industrial Market for West

Survey Covering 5,221 Large Industrial Plants of the West Indicates Wide Extent of Manufacturing Activity Based on Abundant Supply of Raw Materials. Popularity of Power Company Service.

MINING and smelting stood first among industrial power loads of the western states for 1921, with an installed capacity of 588,886 hp. Lumber mills used 180,457 hp., while the preparation of food products of various kinds, including canning and flour mills, required 160,799.6 hp. These figures are revealed by a survey conducted by the Journal of Electricity and Western Industry, the results of which are listed in the accompanying table. Names of 5,221 of the largest industrial plants of the West were used as a basis for the investigation. Of these, information on the installed capacity was available for 1,916 plants, together with information as to whether the plants were enjoying power company service or maintained isolated plants of their own.

The totals cover plants using 1,419,771.62 hp., all of them with an individual capacity of 100 hp. or over. Of these, 1,135,082.57 hp. or 83.3 per cent derived their power from central station lines, while 251,565 hp. or 17.7 per cent was served by plants operated by the establishments themselves. The figures as given are very complete for the states of Oregon and Colorado for all plants using 100 hp. and over. Owing to the great manufacturing activity of California, the list was confined to plants using 200 hp. and over, of which a comprehensive survey was made. Government figures for Utah make it possible to give accurate totals, although individual returns for the state were incomplete. The Superpower Survey, covering the states of Oregon, Washington and Idaho, and Mr. Ralf R. Woolley of the Reclamation Service at Salt Lake City are to be thanked for supplementary material on their respective states, as well as power companies and industrial plants in all parts of the West, who cooperated in securing the data requested. It is believed that this listing and the analysis of figures based upon it is the most comprehensive ever made for this district. It is hoped at a later date to extend the investigation in the hope of making it practically complete for the entire western territory. A complete listing of all plants upon which data are available in regard to the hp. installed capacity will be found on pages 131 to 138 of this issue.

State Distribution of Industries

California stands first among western states in the number of its plants of large size, something over 2200 being included in the list. These cover every line of activity, food products easily taking the lead in the number of establishments, although not in the size of plant. Metal industries, including machine shops and foundries, come second with 337 plants, while sawmills and wood product plants run a close third with 334 concerns. The chemical industry is represented by 194 factories, cement and

clay products with 131 establishments. Significant figures are those which indicate the size of the canning and packing industry, flour mills and grain products, mines, oil refining, refrigerating plants, textile industry, paper products and sugar mills.

Washington ranks second in the number of large plants, with nearly 1000. Lumber and wood products predominate here, with salmon and other food canning and packing in second importance. There is considerable activity in flour milling and grain products throughout the state and Seattle has a generous showing in metal trades and in the miscellaneous group of manufactures. Considerable mining and paper milling are also reported.

Oregon reports 621 industrial plants of large dimensions. Lumber and wood products again take the lead, with food products a substantial second. There are 71 metal and machine plants, centering in Portland, 22 mines and 18 textile plants of large size. Leather goods, refrigeration, and paper mills make up the other industries of importance.

Colorado, with 490, stands fourth on the list in the number of plants, with mining, metal trades, grain products, miscellaneous food products, lumber and wood, canning and packing, chemical plants and sugar mills of importance in the order here given.

Utah, with 257 plants listed, devotes its energies to mining, flour milling, lumber mills, miscellaneous food products, metal trades, food canning, textiles, chemical plants and sugar mills. Montana, not far behind, is overwhelmingly a mining district, with lumber milling, grain products, miscellaneous food products and metal trades the only other fields of importance. Idaho features mining, food products, including flour mills and canning, and lumber. Arizona is predominantly mining, with food products a fair second and refrigeration plants and lumber mills next in importance. Nevada reports 39 mines, 7 lumber mills and 17 plants handling food products, including canneries, flour mills and refrigeration plants. Wyoming has 12 mines on the list, 9 flour mills, 11 food products, including 3 sugar plants, 7 oil and natural gas installations, and other minor industries amounting to 58 in all. New Mexico reports lumber mills and wood products plants, 11 flour mills and 7 refrigeration plants, with other activities in small lumber, bringing the total to 48.

Isolated Plants

Figures on isolated plants are of particular interest. Good reports were received from independent plants from California, Colorado and Oregon, and although it is never possible to state that the entire field is covered, it is safe to estimate that practically all of the larger independent plants in these states are represented. Government totals from Utah add this state to those in which compari-

Geographic Distribution of 5221 Western Industrial Plants with a Rating of \$50,000 or Over, or Having an Installation of Over 100 Horsepower

Industry	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
Brick, Cement												
No. listed.....	4	121	17	7	9	5	3	13	18	39	3	239
No. reporting.....		46	11	1		1		11	3*	3	1	76
Total H.P.....		68,278	3,140	100		480		5,084	7,778*	722	120	85,702
No. on Power Co. lines.....		45	10	1		1		7	3*	3	1	71
H.P. installed.....		67,953	2,990	100		480		4,444	7,778*	722	120	84,586
No. isolated.....		1	1					5				7
H.P. installed.....		325	150					640				1,115
Canning—Packing												
No. listed.....	6	199	25	11	3	4		52	21	95		416
No. reporting.....		25	7	2				18	37*	10		99
Total H.P.....		8,667	2,577	315				8,167	4,156*	1,589		25,472
No. on Power Co. lines.....		22	2	2				14		10		51
H.P. installed.....		8,287	617	315				2,604	3,411*	1,589		16,824
No. isolated.....		3	5					14				22
H.P. installed.....		380	1,960					5,563	745*			8,648
Chemical												
No. listed.....		194	24	3					12	24	2	259
No. reporting.....		35	4						8*			47
Total H.P.....		34,560	2,235						4,735*			41,530
No. on Power Co. lines.....		31	4									35
H.P. installed.....		33,030	2,235						909*			36,174
No. isolated.....		4										4
H.P. installed.....		1,530							3,826*			5,356
Flour & Grain Prod.												
No. listed.....	7	102	58	47	33	5	4	57	33	59	11	416
No. reporting.....		27	41	8				29		5		110
Total H.P.....		12,294	8,306	1,472				8,809		2,252		33,134
No. on Power Co. lines.....		22	32	8				25		5		92
H.P. installed.....		10,577	5,521	1,472				7,059		2,252		26,882
No. isolated.....		5	9					11				25
H.P. installed.....		1,717	2,785					1,750				6,252
Food—Miscellaneous												
No. listed.....	8	233	50	16	22	4	2	42	25	72	8	482
No. reporting.....		36	8					7		1		52
Total H.P.....		14,721	1,875					934		104		17,634
No. on Power Co. lines.....		23	7					7		1		38
H.P. installed.....		10,241	1,275					924		104		12,544
No. isolated.....		13	1					1				15
H.P. installed.....		4,480	600					10				5,090
Laundry												
No. listed.....		29	8					8				45
No. reporting.....		29	8					8				45
Total H.P.....		7,101	1,135					1,865				10,100
No. on Power Co. lines.....		3	4					3				10
H.P. installed.....		989	610					25				1,624
No. isolated.....		26	4					8				38
H.P. installed.....		6,112	525					1,840				8,477
Leather												
No. listed.....	4	67	11	3	11			15	7	18	4	140
No. reporting.....		1	1									1
Total H.P.....			236									236
No. on Power Co. lines.....			1									1
H.P. installed.....			236									236
Lumber—Wood Prod.												
No. listed.....	13	334	42	44	39	7	25	273	33	367	2	1,179
No. reporting.....	3	63	6	1			1	266		6		346
Total H.P.....	1,500	34,779	780	1,575			140	133,719		7,964		180,457
No. on Power Co. lines.....		37	2	1			1	88		6		135
H.P. installed.....		21,477	220	1,575			140	45,149		7,964		76,525
No. isolated.....	3	26	4					62				95
H.P. installed.....	1,500	13,302	530					88,570				103,902
Metal & Machinery												
No. listed.....	8	337	79	11	17	4	1	71	20	112	4	664
No. reporting.....		70	21					20	16*	6		133
Total H.P.....		73,662	13,803					7,914	6,120*	1,977		103,476
No. on Power Co. lines.....		67	20					20		6		113
H.P. installed.....		70,792	13,553					7,764	4,532*	1,977		98,618
No. isolated.....		3	1					3				7
H.P. installed.....		2,870	250					150	1,588*			4,858
Mining—Milling												
No. listed.....	30	47	92	8	96	39	2	22	55	35	12	438
No. reporting.....	3	47	92	8	96	39		22	158*	35	12	512
Total H.P.....	11,930	41,201	53,221	10,752	282,207	28,974		9,758	115,586*	12,057	23,200	588,886
No. on Power Co. lines.....	3	46	69	8	96	39		20	51	35	12	379
H.P. installed.....	11,930	41,073	45,506	10,752	282,207	28,974		8,967	98,347	12,057	23,200	563,013
No. isolated.....		1	23					4				28
H.P. installed.....		128	7,715					2,795	25,720*			36,358
Oil & Gas												
No. listed.....	1	79	2		4				2	4	7	99
No. reporting.....		22	2						4*			28
Total H.P.....		20,778	4,630						638*			26,056
No. on Power Co. lines.....		20	2									22
H.P. installed.....		19,678	4,630						151*			24,459
No. isolated.....		2										2
H.P. installed.....		1,100							467*			1,567

Industry	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
Paper—Paper Prod.												
No. listed.....	1	48	6	1	.....	1	.....	12	4	15	.....	88
No. reporting.....	.....	6	1	.....	.....	1	.....	5	.....	.....	.....	13
Total H.P.....	.....	7,923	300	.....	.....	372	.....	30,661	.....	.....	.....	39,256
No. on Power Co. lines.....	.....	5	1	.....	.....	1	.....	5	.....	.....	.....	12
H.P. installed.....	.....	3,923	300	.....	.....	372	.....	10,488	.....	.....	.....	15,083
No. isolated.....	.....	1	.....	.....	.....	.....	.....	6	.....	.....	.....	7
H.P. installed.....	.....	4,000	.....	.....	.....	.....	.....	20,173	.....	.....	.....	24,173
Pumping												
No. listed.....	2	48	.....	6	.....	.....	4	.....	.....	14	.....	74
No. reporting.....	1	48	.....	6	.....	.....	.....	.....	.....	14	.....	69
Total H.P.....	2,000	43,777	.....	10,575	.....	.....	.....	.....	.....	5,852	.....	62,204
No. on Power Co. lines.....	1	48	.....	6	.....	.....	.....	.....	.....	14	.....	69
H.P. installed.....	2,000	43,777	.....	10,575	.....	.....	.....	.....	.....	5,852	.....	62,204
Refrigeration												
No. listed.....	20	70	10	9	5	4	6	14	5	15	1	159
No. reporting.....	1	46	7	1	.....	1	.....	7	17*	1	.....	81
Total H.P.....	127	28,700	2,050	400	.....	122	.....	1,880	2,152*	90	.....	35,521
No. on Power Co. lines.....	1	37	6	1	.....	1	.....	5	.....	1	.....	52
H.P. installed.....	127	23,370	1,800	400	.....	122	.....	805	462*	90	.....	27,176
No. isolated.....	.....	9	1	.....	.....	.....	.....	4	.....	.....	.....	14
H.P. installed.....	.....	5,330	250	.....	.....	.....	.....	1,075	1,690*	.....	.....	8,345
Sugar												
No. listed.....	.....	24	23	2	1	.....	.....	.....	9	2	3	64
No. reporting.....	.....	7	8	1	.....	.....	.....	.....	16*	2	.....	34
Total H.P.....	.....	14,626	18,774	450	.....	.....	.....	.....	14,948*	237	.....	49,035
No. on Power Co. lines.....	.....	5	4	1	.....	.....	.....	.....	.....	2	.....	12
H.P. installed.....	.....	3,526	4,450	450	.....	.....	.....	.....	3,138*	237	.....	11,801
No. isolated.....	.....	2	4	.....	.....	.....	.....	.....	.....	.....	.....	6
H.P. installed.....	.....	11,100	14,324	.....	.....	.....	.....	.....	11,810*	.....	.....	37,234
Textiles												
No. listed.....	7	142	15	1	1	.....	.....	18	15	26	.....	225
No. reporting.....	.....	12	.....	.....	.....	.....	.....	5	.....	.....	.....	17
Total H.P.....	.....	15,897	.....	.....	.....	.....	.....	1,225	.....	.....	.....	17,122
No. on Power Co. lines.....	.....	9	.....	.....	.....	.....	.....	4	.....	.....	.....	13
H.P. installed.....	.....	15,222	.....	.....	.....	.....	.....	355	.....	.....	.....	15,777
No. isolated.....	.....	3	.....	.....	.....	.....	.....	3	.....	.....	.....	6
H.P. installed.....	.....	675	.....	.....	.....	.....	.....	870	.....	.....	.....	1,545
Miscellaneous												
No. listed.....	5	141	25	5	7	3	1	25	.....	21	2	235
No. reporting.....	4	141	25	1	.....	1	.....	10	.....	10	1	193
Total H.P.....	1,810	54,429	24,038	462	.....	151	.....	3,707	39,305*	3,772	400	128,074
No. on Power Co. lines.....	1	83	21	1	.....	1	.....	9	.....	10	1	127
H.P. installed.....	250	42,289	7,538	462	.....	151	.....	1,591	.....	3,772	400	56,453
No. isolated.....	3	58	4	.....	.....	.....	.....	6	.....	.....	.....	71
H.P. installed.....	1,560	12,140	16,500	.....	.....	.....	.....	2,116	.....	.....	.....	32,316
All Industries												
No. listed.....	116	2,228	490	163	248	74	48	621	257	918	58	5,221
No. reporting.....	12	674	245	29	96	43	1	450	259*	93	14	1,916
Total H.P.....	17,367	488,336	115,796	26,101	282,207	30,099	140	203,871	195,418*	36,716	23,720	1,419,771
No. on Power Co. lines.....	6	517	188	29	96	43	1	207	52	93	14	1,246
H.P. installed.....	14,307	423,146	93,291	26,101	282,207	30,099	140	86,636	118,728*	36,716	23,720	1,135,092
No. isolated.....	6	157	57	.....	.....	.....	.....	245	.....	.....	.....	465
H.P. installed.....	3,060	65,189	22,505	.....	.....	.....	.....	114,965	45,846*	.....	.....	251,565

*Figures from R. R. Woolley, U. S. Reclamation Service.

sons may be made. The total hp. reported in isolated plants was 251,560, or 24.6 per cent of the 1,020,668 hp. totals from the states reporting both classes of plant. Lumber mills form the vast majority of the load, 62 being reported from Oregon, 26 from California and 7 from Arizona and Colorado, with a total of 103,902 hp. This is somewhat more than the total in lumber mills reported on power company lines, which comes to 76,525 hp. The plants on the whole are large, averaging 1094 hp., and use the waste products of the mill for fuel.

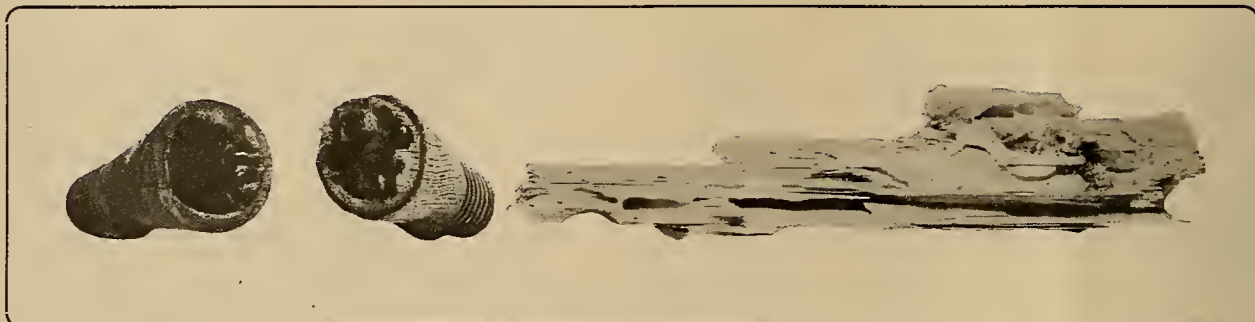
Second in importance are the sugar mills, also large plants of about 3,500 hp. each, reported from California, Oregon and Utah, with a total of 37,234 hp. Mines come third with 36,358 hp., 23 of them being reported from Colorado, 4 from Oregon and 2 from California. These also are plants of some size, mostly users of water power, although steam plants are reported from several. Buildings, hospitals and other miscellaneous users of power to the number of 71, with an average installation of 455 hp., generate their own power and use 37,234 hp. in all. California reported the largest number of these, the 58 isolated plants of this type constituting the larg-

est group of isolated plants in that state. Paper mills are next, centering in Oregon, with 24,173 hp. between them. These are large plants, averaging 3400 hp., mostly water power, several of them also using power from central station lines.

Of other plants, a large number of canneries use small amounts of steam power, most of them being also served with central station power. Some 38 laundries average about 200 hp. each in small steam plants. In this business power may almost be regarded as a by-product and in consequence this total somewhat exceeds those plants reported using power company service. In the total field of refrigeration, the number of isolated plants is small, but 14 of this group report 8,345 hp. in independent installations. Flour mills to the number of 25 report 6,252 hp., the majority of them from Oregon and Colorado. The remainder of the plants reporting are in the fields of chemical industries, miscellaneous food plants, metal trades, oil refineries, textile mills and cement plants in the order named. Except in the field of lumber and wood products, it may safely be said that the extent of power independently generated is negligible.

Destruction of Cedar Poles by Termites in California

One of a Pictorial Series Featuring Interesting Applications of Electric Service,
Advances in Home, Industrial and Power Construction and Noteworthy
Developments in Western Progress



Insulator pin which has been hollowed out by the white ants, or termites. Boring into the pole below the surface of the ground the ants honeycomb the wood, leaving only a thin shell on the outside. First evidence of the destruction caused by the ants is revealed when the pole is blown down or an attempt is made to move it.

A section of the heartwood of a cedar pole which has been attacked by ants. In some locations in southern California as many as fifty per cent of the poles set prior to 1910 have been attacked by white ants and are in a weakened condition on account of the work of these pests. Creosote treatment is said to prevent attack.



The photograph of a cross-section of a pole shows the characteristic method in which the white ants work.

CEDAR pole users will be interested to know the extent of the damage which is being done to the poles of the Southern California Edison Company throughout that section of the state by white ants. According to R. E. Cunningham, superintendent of distribution, recent investigations which were made disclose the fact that white ants are attacking the untreated cedar poles in large numbers throughout the territory from San Diego county to Santa Barbara and from the coast as far inland as Redlands.

In some locations as many as 50 per cent of the poles set prior to 1910 have been attacked by white ants and are in a weakened condition on account of the work of these pests.

The accompanying photographs by R. J. C. Wood illustrate the ravages and the characteristic method in which these white ants work. Being blind they seem to instinctively shun the light and confine their operations beneath the surface of the pole. From a casual inspection of the outside of the pole, it might appear that the pole was perfectly sound, but rapped upon by a metal bar, the surface will give way and disclose the honeycombed recesses left by the ants.

It seems that the ants come in by subterranean passages and enter the pole in the section below the ground and work up through the pole, both through the interior as well as that portion just below the surface, extending at times even to the top of the pole and eating out the interior of the pins.

Careful investigation has been made of the poles which were treated with creosote by the open tank method, and it now appears that none of these poles, even though they have been set since 1910, show signs of having been attacked by white ants. The presence of creosote in the butt of the pole evidently prevents the white ants from attacking the pole.

The habits of the white ant are such that it is necessary for it to return to the ground frequently for water and it will not travel over the surface of the pole. In an untreated pole the ants keep their run-ways open from the base of the pole upward and when disturbed or when they desire water, can easily return into the ground.



White ant queen in wing state (enlarged). The ants are from three-eighths to one-quarter of an inch long, the queen is about twice as large as the ordinary worker ant.



The white ant worker, shown above in the enlarged photograph, is blind and apparently defenseless, being protected by the soldier ants, from its enemies



Enlarged photograph of a soldier ant. The duty of the soldier seems to be to protect the white ant worker from its enemies the red ants. They are of ferocious disposition.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

THE SALESMAN HIMSELF—(Cont'd)

In the preceding section of this Study Course we have imagined a salesman calling on you in your office or shop, and have studied the first impressions which he produces on you, and the several factors responsible for these impressions. We followed him as he entered your place, approached you, and then came up to you and exchanged greetings with you. We shall now suppose that you have given him a chance to present his proposition. In doing so he will attempt to influence you in a definite direction—that of buying what he has to sell. He will first give you his basic sales-talk and try to predispose you toward his proposition; then he will go into details, meet your objections, and in general convince you in favor of his goods; and finally he will try to impel you toward definite action—toward the purchase of that which he sells.

Ordinarily the buyer does not meet the salesman during business hours for the purpose of spending a pleasant time with him. The buyer has many other things to attend to besides the salesman. Therefore, he is willing to give the salesman at first only enough time that he may be shown that the proposition presented really deserves further investigation. Hence the first "sales-talk" of the salesman should be so formulated as to arouse the definite and favorable interest of the buyer in the shortest possible time.

Conciseness of Presentation

If a man knows his proposition well and has thoroughly prepared himself to present it to the buyer he can always make his presentation brief but inclusive of all the essentials, and this is what we understand under "conciseness." The salesman who tries to sell without a well thought-out sales-talk, who talks in a rambling way, and talks very long, is—if you look at it from the buyer's angle—not a very honest fellow because he appropriates to himself an undue amount of the buyer's time. We all know that "time is money," but when it comes to the buyer's time the average salesman is too frequently forgetting this fact, with the result that his long-winded talk becomes wearisome and tedious to the buyer. Can we "predispose" a man toward anything by first stealing his time and boring him to death? Lack of preparation as evidenced by absence of conciseness in the salesman's sales-talk is a definite sign of disrespect to the buyer, and is invariably resented by the buyer. Do you offend your customers by long-winded and rambling sales-talks, or do

you predispose them towards your proposition from the start by presenting it to them in a concise form? If you were the buyer, how would you rate your own selling talks on that point?

Clearness of Presentation

Clearness of statement consists of presenting all the facts which are pertinent, none which are immaterial, and all in simple, lucid language, and in proper logical sequence. When we do not know our subject we are apt to take recourse to platitudes and generalities. When we are ill-prepared on our subject we are sure to forget some points, to state them haphazardly and not in their proper order, to repeat ourselves unnecessarily, and in general to produce a vague and unsatisfactory impression by our talk. And then again, because our own thoughts on our subject are not clear and definite enough, we run the danger of not conveying them in a clear and definite way to the buyer, particularly in the brief time he is willing to devote to us at first, before his interest is properly aroused. Are all of your statements clear when you make your sales-talk? Are your explanations adjusted to the understanding of your individual customers? Be your own judge, but be frank and sincere with yourself. Put down your score on this point, and increase it if you notice that your customers follow your talk more and more easily as you improve in clearness.

General Competentness

There are really only two classes of sales that can be made even by incompetent salespeople, the universally known branded goods in the class of Ivory Soap and Heinz Pickles, and the goods offered for sale in 5 and 10-cent stores where we have to look out for ourselves and do not expect any "service" at all. Have you asked yourself how the average layman judges the goods he buys in all cases but these two just explained? He looks, usually without being aware of it, upon the salesman as his buying adviser, and the more competent the salesman appears to be, the more ready is the buyer to accept the salesman's judgment and advice in the matter of purchasing. This is similar to our attitude towards a physician. If he gives us the impression of competentness, we believe in him and are willing to be influenced by his advice. If he does not succeed in creating that impression in us, no matter how good and sound his advice, we will not follow it if we can find another doctor to consult.

In other words, it is essential for a salesman not only to be competent, but also to appear competent.

Definiteness of statements, directness of answers, absence of "beating around the bush," and above all, that intimate familiarity with the goods sold, which we will discuss in a separate section of this Study Course. All these tend to create in the buyer a high degree of confidence in the salesman's competence.

The first sales-talk alone rarely sells. It will hardly ever cover all the points the buyer will want to know. And then there are all the possible objections which the buyer is sure to raise and which have to be "overcome" by argument and otherwise. The favorable interest of the buyer having been aroused the salesman will have to use his convincing influence to convert this into definite desire, and to remove the mental obstacles which keep the buyer from coming to a decision.

Enthusiasm

The salesman who cannot develop a high degree of enthusiasm for his work and especially for the product he is selling will never pass beyond the stage of a mere order-taker. In fact, more failures in salesmanship are to be ascribed to the salesman's indifference and lack of enthusiasm than to most of the other causes. This depends mostly on a wrong point of view. The salesman assumes that he is selling certain things to the buyer, whereas, as a matter of fact, he is doing nothing of the sort. People buy things only for the service or utility they get out of them. We buy coal to enjoy the warmth we get out of it; a piano to enjoy the music it can be made to produce; we buy eggs to eat them, and coffee to drink, and to enjoy the satisfaction we get from doing this. With the exception possibly of some fake patent medicines there is practically nothing made or produced commercially which does not give to its user a definite satisfaction and render him a definite service. Give free reins to your imagination! Conjure up in your mind in connection with everything which you are selling a picture of the buyer enjoying its use and getting a lot of satisfaction out of it, and you cannot fail to develop a healthy enthusiasm in the thing you sell, because it renders a good and valuable service to the buyer, and in your own work as a salesman, because you help every customer of yours to get so much more satisfaction out of life. Get this "service" point of view, and you cannot escape becoming an incurable enthusiast.

Truthfulness

Never under any conditions make any mis-statements about your goods or anything directly connected with your business. Once in a very long while you may get away with an untruth. But ordinarily mis-statements made by salesmen carry a kick-back which may be compared with the kick of a mule. If you cannot keep from bluffing, join a poker club, you will lose much less than if you will try to satisfy your craving for bluff during the selling process. Have you checked yourself up on this point while reading about it? You do not have to show your self-rating score to anybody—so put your grade down, and revise it later if it is less than 100.

How can you hope to convince me of anything if you are not fully prepared to answer all the questions I may choose to ask? Your answers must be "snappy" and satisfactory, or else I will not trust your "advice." Of course, this ability comes only with experience. So you had better list every question and objection related to the specific thing you sell, and study them over. Put down the proper answer, and learn it. Are you preparing yourself systematically for possible questions and objections, or do you simply trust to your ingenuity and luck?

There are really only three characteristics which will help you to impel action on the part of the buyer if you have succeeded in arousing his desire. They are the ones which every salesman must develop in himself unless he wants to break down in the "closing" of many of his sales.

Persistency

In many dictionaries you will find "persistency" explained as "obstinacy," the reason for this being that it would be too slangy for a dignified dictionary to define it as "stick-to-it-iveness." Do not pester your client, but "stick to it." Somehow, most people are so constructed that they dislike to make a decision but prefer to put it off. This is usually due to their desire not being aroused strongly enough. And it is up to the salesman to realize this, and to persistently stimulate the imagination of the buyer until the decision is made and the sale closed. Are you game enough to redouble your selling efforts when you seem to have lost the sale, or are you readily discouraged? Are you yourself really sufficiently sold on your goods to be able to sell them to others, or do you just "make a stab" at selling?

Assuredness and Diplomacy

We all are apt to follow "leaders" because they seem to know what to do. Similarly, in the process of selling, the salesman who exhibits a proper amount of assuredness in leading the buyer to the "close" of the sale will have more success than the one who hesitates and wavers. This "leadership" through assuredness should not be confounded with "cocksureness" by the salesman. Assuredness is based on competence and enthusiasm, and it is so infectious because it cannot be faked. If you like your work and your goods, and if you know your business well, it is one of the easiest things to show the quality of assuredness. What is your present estimate of yourself on this point? Observe yourself in action, and just the fact that you are observing yourself on this count will help you in acquiring greater and greater assuredness, and assist you in closing your sales more frequently.

Diplomacy, as practiced by the salesman, is to be understood as opposed to bluntness. It consists substantially in the ability of the salesman to apply his superior knowledge of the buyer's psychology without disclosing this to the buyer. Diplomacy is never trickery. To be successful in selling we must observe the individual character of each buyer, and use this and our training in salesmanship to the purpose of overcoming that natural resistance to arriving at definite decisions of which we have spoken.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.
Ideas and Suggestions by Practical Men.

Ship Fuel Bill Decreased by Central Station Power

During the last few years there has been an increasing amount and variety of load taken on by central stations which formerly secured power from their own plants. It is rather unusual even in this day, however, for a public utility to supply war ships with electricity.

San Diego, the home port of the Pacific destroyer fleet, usually has from 30 to 60 destroyers in the harbor. These are grouped in nests, and tied along a wharf, as shown in the accompanying illustration, which was photographed from an airplane.

It was found to be very wasteful for each ship to keep its own plant in operation to supply lighting and steam for heating and cooking, etc., and moreover the personnel on some of the boats was reduced to such an extent that there were scarcely enough men left to properly operate and maintain the ship equipment. The drastic reduction in the amount of money appropriated for fuel supply makes it necessary that every opportunity be taken advantage of to economize by efficient operation. With this end in view, a contract was entered into with the San Diego Consolidated Gas & Electric Company to supply lighting service at various points along the wharf. Each "nest" of ships "plugs" in at this point to secure lighting and either one of the ships in the group operates its boilers, or else a

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

steam line is connected from the wharf to supply heating requirements.

The connected load of a destroyer averages about 4 kw. of lighting and 15 hp. in power. The motors which are of the direct current type, are not ordinarily operated when the ship is in port. The ship's plant consists of two 25-kw. turbine driven d.c. generators.

The blacksmith and machine shops, as well as the battery charging plant, which handles the work connected with the fleet, are located on the wharf. These are served by two motor generator sets of 90 kw. aggregate capacity. There is a total connected load of over 100 horsepower in motors in the shops. The battery charging load is heavy as there are a great number used on the destroyers. There have been as many

as 750 batteries floating on the line at one time, although the average load is about 300 batteries.

This unique load has a very good load factor, the power and battery charging keeping the demand steady throughout the day. The consumption is about 100,000 kw-hr. per month.

Although the government is undoubtedly making a neat saving by using central station service for these ships, it is rather difficult to estimate just what this economy would amount to.

P. P. PINE,

Sales Engineer, Commercial Dept.
San Diego Consolidated Gas
& Electric Company.

Utilization of Natural Gas in Making Carbon Black

Millions of cubic feet of natural gas, one of the chief co-products of the oil fields of California, Montana and Wyoming, are being lost each year owing to the fact that the commodity cannot be used as a fuel as rapidly as it is produced. Recent figures show that the supply of natural gas below the surface of the earth in the states where it has been most plentiful is decreasing at an alarming rate.

Likewise the demand for carbon black which is produced from natural gas is increasing more rapidly than this element is being made. Many proposals have been made regarding the utilization of the natural gas supply in California yet no attempts have been made to manufacture carbon black, but the gas has been allowed to go to waste.

Doubtless if the facts concerning the use of this element in many of the most important manufacturing processes is set forth, together with figures concerning its production, there might be some attempt to turn the gas into carbon black in California.

To illustrate the uses of this product, it might be said that carbon black has been used as a pigment in printer's ink instead of lampblack since 1864. More recently it has become one of the chief substances used for coloring and reinforcing rubber and as a pigment in paint. Stove and shoe polish, black leather, phonograph records, buttons, carbon paper, celluloid, electrical insulators, cement, coloring ink and many other important American products are dependent upon carbon black at some stage of their manufacture.

These data have been set forth because during recent months there has been considerable discussion regarding the utilization of natural gas in California, which at the present time constitutes an enormous waste.

L. K. BLAKE.

Bakersfield, Cal.



Remarkable economies in fuel are effected at the Pacific destroyer squadron base at San Diego by connecting the vessels with the central station lines while they are in port, thus eliminating the use of their boilers to supply power.

Electric Oven Shows Economies in S. F. Factory

New Features of Automatic Enameling Oven Permit 100 Per Cent Labor Saving in Plant of Forderer Cornice Works

The cleanliness of electricity as a fuel is a recognized virtue. An even greater advantage of electricity over fuels in general, is the reliability of service and its unvarying heat at definite adjustments; together with the simple means of controlling the temperature, as well as the duration of the cycle.

The Forderer Cornice Works of San Francisco, manufacturers of hollow steel doors, interior trims, steel partitions and hollow steel window frames and sashes, have recently installed a kiln-type enameling oven, built along the most modern engineering lines. The

either or both ends of the oven independently, or both ends in unison.

The heaters are of the open ribbon construction type, wound on fire clay bushings, assembled on steel tie rods, the whole supported by pressed steel end plates. The construction of these heaters permits their suspension from flanges on the heater end frame, allowing ready expansion and contraction of all parts of the heater as well as affording a simple means of mounting. Each heater has a capacity of 2.3 kilowatts, there being 32 heaters installed, having a combined capacity of 73.6 kilo-

control relay, which in turn closes the three-pole magnet switch, or main contactor furnishing power to the heaters. As the oven temperature rises, the thermostat will leave its low position, the three-pole magnet switch, controlling the oven heaters being held in place by a mechanical interlock on the control relay. The thermostat on reaching the high position, short circuits the control relay, de-energizing the three-pole magnet switch, thereby cutting off the power from the oven heaters. The oven, on again reaching its low or minimum temperature, repeats this cycle.

It was found necessary and beneficial to have the duration of the bake under automatic time control. The control circuits of both ovens have been so connected with reference to this time switch, that the operator may put under time control either one or both ends of the oven simultaneously with insulated heat barrier in position; or both ends operated in unison with heat barrier removed. This scheme of operation permits the workmen to fill the ovens ready for a bake before closing the shop, the time clock starting and stopping the bake during the night or early morning, the material being thoroughly baked and ready to be taken from the oven, when the workmen arrive the next morning. Putting through a bake between closing time of one day and opening time the next morning is a 100 per cent saving of labor during the cycle of that particular bake. Another labor saver is the electric control thermostat or, in this particular case, thermostats which keep the temperature of the ovens at predetermined value.

Determining the proper baking temperature and duration of bake for every color and type of enamel used in their process has enabled the Forderer Cornice Works, with the aid of perfect temperature and time control, to turn out uniformly finished material. "Spoilage" is unknown to this concern.

That the characteristic of this installation may be fully understood, the following operating conditions are given:

Automatic time, temperature and ventilation control.

Power service, 220-volt, two-phase, 60-cycle.

Connected capacity, 73.6 kw.

Initial temperature, 50 degrees F.

Final temperature, 200 degrees F.

A bake of 4000 pounds consisting chiefly of hollow steel doors, was placed in the oven with heat insulating barrier removed. The results of this particular bake were as follows:

Load 4000 pounds, hollow steel doors.

Room temperature, 47 degrees F.

Temperature of oven at end of bake, 200 degrees F.

Time required to reach maximum temperature, 35 minutes.

Time oven was held at constant temperature (200 degrees F.), 3 hours.

Kva. = $(V \times I) \div 1000 = 70.2$ kw.

Actual kw. (watt-hour meter) = 69.82 kw.

Power factor of heaters = 98.5%.

Power consumed for entire bake = 100 kw-hr. for 4000 pounds metal baked.

Power consumption per pound of metal baked, 0.025 kw-hr.

Pounds of metal per kw-hr. = 40.

ELBERT KRAMER,

Industrial Heating Specialist.
Westinghouse Electric & Mfg. Co.



The automatic electric enameling oven in the Forderer Cornice Works, San Francisco, showing a full load of metal furniture ready for baking. New features permit this work to be done during the night so that when the workmen return to the plant, the oven is ready for another load.

interior dimensions of the oven are 8 ft. high, 10 ft. wide and 22 ft. long. Provision is made for the insertion of a heat-insulated barrier spanning the center of the oven, thermally insulating each end. The walls, doors and top are double wall construction and filled with three inches of powdered heat insulating material. The floor is three-eighths inch steel plate, resting on two inches of heat insulating brick. There is no through metal between the inner and outer surfaces of the walls, top or doors, except at the junctions at each end of the oven.

The electrical equipment is arranged to give individual operation to either or both ends of the oven with the heat insulated barrier in place; or, operation in unison, of both ends, with the heat insulated barrier removed. Each end of the oven is controlled by its own bank of heaters with power control panel, electric control thermostat system of ventilation consisting of motor-driven exhauster, door switch and push button station. A time clock is connected for time or cycle control of

watts. The power for the heaters is controlled by a three-pole magnet switch or contactor.

The ventilating system is so designed that the ends, the corners and the center of the oven, all receive the same degree of ventilation. Cold air enters through the top of the oven, the exhaust air being taken three-fourths from the bottom and one-fourth from the top. The motor for the exhauster is controlled by two single pole relays. The control circuit for the automatic panel is connected on the motor side of the two relays mentioned above, in such a way that the motor driven exhauster is always operating when the control circuit is energized. A thermostat, push button station and door switch are so connected in the control circuit, that the following cycle of operation can be obtained:

With the oven cold at the start, the thermostat will make contact on the low position. The door switch and push button are closed, the control circuit being completed through the low contact of the thermostat, energizing the

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Waffle Eating Contest Features Denver Window Display

Westinghouse electric waffle irons were given a supreme test during the Electrical Week recently held in Denver under the auspices of the Electrical Co-operative League.

As one of the features held daily in the downtown dealers' stores, a waffle eating contest was staged between three negro boys from one of Denver's settlement missions, in the windows of the Denver Gas and Electric Light Company.

Tom Yonley of the Mine and Smelter Supply Company, Westinghouse distributors in the Rocky Mountain territory, lost track of the waffle consumption after one of the boys had eaten thirty-five of the crisp cakes swimming in butter and syrup. Assisting in putting on the display was M. E. Lanning of the Westinghouse Company and R. G. Gentry, assistant commercial manager of the Denver Gas and Electric Light Company. Miss May E. Butterfield, a Westinghouse demonstrator, operated the waffle irons during the contest.

According to Clyde H. Osborn, advertising manager of the Mine and Smelter Supply Company, who originated the contest, the window demonstration, because of its novelty and human appeal, proved an excellent advertising medium, judging from the sales which were made and the inquiries received after staging the contest.

The waffle eating contest was only one of a number of novel methods used to stimulate interest in electrical appliances during Electric Week.



During Electrical Week in Denver recently a waffle eating contest was staged in the window of the Denver Gas and Electric Light Company which materially increased sales of this type of electric appliance.

Convenience Outlet Installation Costs Compared California Cooperative Campaign Prepares Charts Showing Wiring Data for Five-Room Cottage and Apartment

In an effort to further stimulate interest among the contractors regarding the installation of convenience outlets in homes and apartments, the contracts for which they might secure, the California Electrical Co-operative Campaign, through its convenience outlet committee, has prepared two sets of charts showing the comparative costs of wiring jobs for these types of dwellings.

The charts constitute an accurate listing of all material which might be used in wiring a five-room apartment or five-room cottage when no convenience outlets were installed, together with a listing of the additional material required when two convenience outlets are installed. Price comparisons in percentages are also made for each job.

The following list shows the material used in a five-room apartment with no convenience outlets, together with the service material:

- 7— $\frac{1}{2}$ -in. Conduit Boxes (Round).
- 7— $\frac{1}{2}$ -in. Conduit Boxes Covers.
- 7— $\frac{1}{2}$ -in. Fixture Studs.
- 7— $\frac{1}{2}$ -in. Conduit Boxes (Square).
- 7— $\frac{1}{2}$ -in. Conduit Boxes Switch Covers.
- 7—S. P. Push Button Switches.
- 5—1-Gang O. B. Plates.
- 2—1-Gang N. P. Plates.
- 1—30 Amp. D. P. Ext. Oper. Switch.
- 2—10 Amp. Fuse Plugs.
- 240 Feet $\frac{1}{2}$ -in. Galv. Conduit.
- 500 Feet No. 14 D. B. R. C. Wire.
- 56— $\frac{1}{2}$ -in. Locknuts.
- 28— $\frac{1}{2}$ -in. Bushings.

Service

- 30 Feet $\frac{3}{4}$ -in. Conduit.
- 100 Feet No. 10 S. B. Solid R. C. Wire.
- 1— $\frac{3}{4}$ -in. Type E Taplet.
- 1—30 Amp. T. D. Ext. Oper. Switch.
- 3—30 Amp. Fuse Plugs.

The additional material for two convenience outlets follows:

- 2— $\frac{1}{2}$ -in. Rd. Conduit Boxes.
- 2— $\frac{1}{2}$ -in. Rd. Conduit Boxes Covers.
- 2 Convenience Outlets.
- 2 Convenience Outlets, Plates.
- 2 Convenience Outlets, Plugs.
- 8— $\frac{1}{2}$ -in. Locknuts.
- 4— $\frac{1}{2}$ -in. Bushings.
- 36 Feet $\frac{1}{2}$ -in. Galv. Conduit.
- 80 Feet No. 14 D. B. R. C. Wire.
- 1—30 D. P. Service Box.
- 2 No. 1935 Plug Cutouts.
- 100 Feet No. 12 S. B. Sol. R. C. Wire. Service.

Cost figures show that the installation of but two convenience outlets means but the small increase of 22 per cent in the value of the electrical material installed.

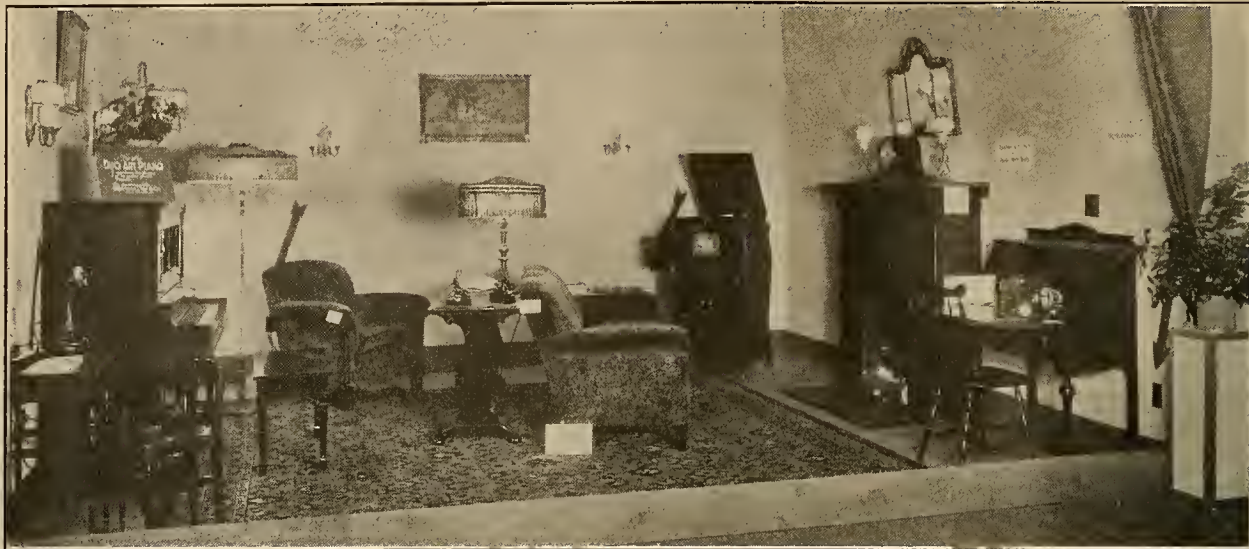
For a five-room cottage or bungalow, with no convenience outlets, it is estimated that the following would be required:

- 9 Ceiling Outlet Boxes.
- 7—1-Gang Switch Boxes.
- 1—2-Gang Switch Boxes.
- 40 Loom Clamps.
- 450 Feet No. 14 D. B. R. C. Wire.
- 22 Feet $\frac{1}{2}$ -in. Galv. Conduit.
- 50 Feet No. 12 S. B. Solid R. C. Wire.
- 1 Type E. $\frac{1}{2}$ -in. Taplet and Cover.
- 1—30 Amp. D. P. Service Switch Ex. Oper.
- 2—10 Amp. Plug Fuses.
- 300—3x5/16 Porc. Tubes.
- 80—5 $\frac{1}{2}$ -in. 10c Naillet Kobs.
- 50 Feet 1/32-in. Flextube.
- 9— $\frac{1}{2}$ -in. Fixture Studs.
- 9—S. P. Push Button Switches.
- 4—1-Gang O. B. Plates.
- 3—1-Gang H. P. Pdates.
- 1—2-Gang O. B. Plates.

The additional material necessary for the installation of two convenience outlets would be:

- 2—1-Gang Boxes.
- 2 Convenience Outlets.
- 2 Convenience Outlet Plates.
- 2 Convenience Outlet Plugs.
- 8 Feet 7/32-in. Flextube.
- 100 Feet No. 14 S. B. Solid R. C. Wire.
- 80—3x5/16-in. Porc. Tubes.
- 8—5 $\frac{1}{2}$ -in. Naillet Knobs.
- 1—30 Amp. D. B. Service Box.
- 2 No. 1935 Plug Cutouts.
- 4—10 Amp. Plug Fuses.
- 8 Loom Clamps.

In this case the value of the material for the two outlets would increase the cost of the job approximately 27 per cent.



The living room in the model electrical home at the Spokane Electric Show with its many conveniences. One of the features of this room was a small radio set. Note the arrows pointing to the convenience outlets.



The dining room demonstrated the simplicity and beauty of a room equipped with electrical appliances. Even the lighting fixtures were carefully chosen. Particular stress was laid on a portable quadruple plug for use with the table appliances.

Home Electrical at Spokane Show Proves to be of Practical Value to Industry

Four Room Model Display Attracts as Many Visitors During Week of Exposition as Actual Home in Residence Tract, Dealers Say.

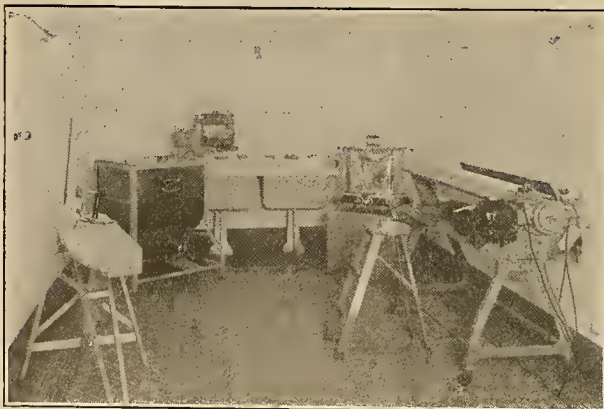
SSPONSORED by the Northwest Electrical Service League, the Spokane Electric Show, held in Spokane, Wash., recently, claimed the cooperation of every member of the electrical industry in that community. Its success is measured from three different angles: first, the large attendance of substantial citizens directly stimulated sales even though the exposition was solely educational; second, the community was awakened to the importance of the electrical industry; and third, the entire electrical industry was united in a common purpose.

There were no booths for individual firms. Instead the exhibits were arranged in classes of equipment so as to afford a comprehensive display of electrical servants in compact units. Demonstrations of each type of appliance were given at all times during the day.

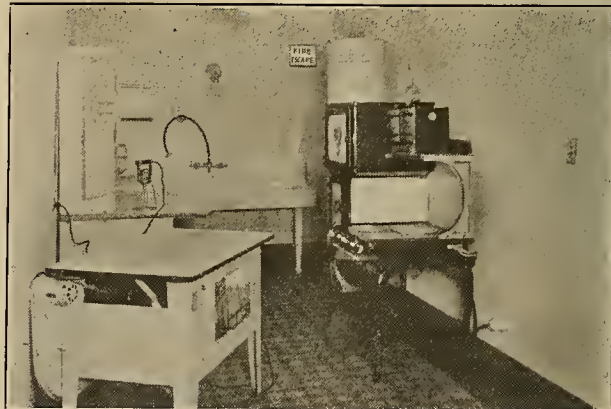
The home electrical proved to be the most interesting and educational exhibit of the show. It consisted of four model rooms, furnished with practically all of the appliances used today and arranged like a series of display windows. In the living room there was a compact radio set, electric piano and phonograph, fire-log and floor and table lamps. The dining room emphasized the use of table appliances and a portable quadruple floor plug. In the kitchen, range, water heater, food mixers and a dish washer were exhibited. The laundry drew the attention of the largest number of women visitors.

Sales of electrical goods increased appreciably following the show, according to reports from dealers. In many instances dealers stated people came directly from the exhibits to the store to purchase some appliance they had just seen demonstrated.

The members of the industry were not content to merely hold an electric show, but immediately following its conclusion they held a meeting to discuss methods of reaping the good-will created during the week if exhibits. Sales campaigns were instituted and other methods of carrying the message of the electrical servant to the general public were discussed.



The laundry was the center of attraction for the feminine visitors at the show. With its mangle, washer, hot-plate and conveniently located lights, it ably demonstrated the electrical servant idea.



The kitchen was arranged to show the housewife the number of steps that might be saved and benefits to be derived from electrical appliances. The glass door in the dishwasher aided demonstrations.

The Contractor-Dealer and His Advertising Plan

The Elements of Good Advertising and How They May Be Applied to This Branch of the Electrical Industry

By W. D. MORIARTY

Field Representative, Northwest Electrical Service League

In small towns and in large cities the average merchant thinks he is very much better known than he is. He can never, seemingly, get it through his head that people pass by his store day after day and never find out it is there. In a town of less than five thousand I have stopped on a corner and asked a group of very evident "natives" the location of the oldest contractor-dealer's store in the town without getting the desired information.

There are two classes of new customers who may come to your store as a result of advertising, newcomers who naturally judge stores by the advertising they do, and older residents who have been trading elsewhere and are not especially attached to the store where they have been accustomed to go. For this latter class it takes real advertising to get them to take the trouble to look you up. And it takes persistent advertising. They must have a reason for changing a habit. Of course many, very many, are of the wandering type or of the shopping type and drift from store to store, but three-fourths of the people with steady incomes tend to develop steady places to do their trading, and to sell one of these the idea that your store is a good place to trade is worth pleasing three or four drifters.

Advertising to Hold Old Customers

Does anyone imagine that Swift's Premium Ham is advertised primarily to secure new customers? Far from it. Of course that is one of the reasons, but it is not the chief reason. The chief reason why any well established article or store makes continued and increasing use of advertising is to maintain its position of supremacy. Keep your old customers sold and they will help you gain new ones. Quite true. But your old customers like to see your advertisements, like to feel they are in touch with you at other times than when they come into the store.

Suppose your competitor advertises and you do not, what are your chances of maintaining ascendancy in the minds of your customers? At least you are handicapped. And remember that your chief competitors do advertise. Even if all the contractor-dealers in the town agree to do no advertising, their chief competitors are still hard at it telling every subscriber to a newspaper and every reader of a billboard why they should spend their money with THEM.

Advertising in Your Windows

The least a man can do, the very least he can do and still maintain his self-respect as a merchandiser, is to pay some attention to his windows. The jeweler and the pawnbroker, the clothing store and the shoe store, and above all the department store, advertise to the passer-by the best reasons they can think of which will make him patronize them. And with the aids furnished him the contractor-dealer has little excuse for not meeting this window competition on its own grounds.

To be sure, taste is a powerful factor

in highly effective window dressing. The electrical dealer cannot hope to secure with no expense the highly effective windows of a department store which goes to great expense in dressing its windows and has a specialist in this field. No sane dealer, however, will pretend that if he is willing to use the helps sent him and bring to the task whatever ability he has, he cannot at least produce a thoroughly respectable window, one that will suggest that the store has someone who knows his business and takes enough pride in it to care for appearances.

Rules for Window Dressing

These rules are not given as iron-clad rules which must never be violated. It will be well, however, for the man not skilled in the art to keep them well in mind. They will save him time, and they will keep him from putting in windows which look all right to him but which will be less effective than he might otherwise secure.

Rule 1. In the show windows, show cases, and wall cases, things should be grouped in twos and threes, seldom in fours, and never in fives or sixes. Things may be grouped in two sets of threes or three sets of threes, but not in four sets of threes. A row of six or eight irons, for instance, must be broken into groups.

Rule 2. Put no article behind a partition bar, either in window, show case or wall case. If your show case has an upright bar down the front of it or across its top, put nothing in such a position that this bar will bisect it when the customer is directly in front or above it.

Rule 3. In so far as is possible arrange your displays in rectangles which are .6 as wide as they are long. If the depth of your window is three feet and its width ten feet, it naturally falls into 3 x 5 spaces, and if it is all used for one unified display you need to do an especially good job of arranging things. This rule has its value in calling attention to difficulties which the shape of windows impose almost necessarily, and to the fact that better results are often secured by breaking a window up than by using the whole window for one display. For instance, a 3 x 12 window might better have even three divisions than only one if the articles are small, for the sheer weight of numbers would be apt to produce a hodge podge effect no matter how regularly they were placed.

Cut Price Advertisements

Much bad advertising has been done by the advertising departments of manufacturers and passed on by them to retailers. The least cut in price which is really effective in motivating purchases is 20%. This is pretty generally understood by experts in advertising. A ten per cent cut is so small that it really makes little difference except as a confession that the previous price was too high. Moreover, the margin of profit in this field is so small that a ten per

cent cut which the dealer himself might make, that is without corresponding reduction in his purchase price, would more than wipe out all his profit.

Department stores and other stores carrying stocks of many kinds may advertise marked price reductions on one type of goods and make good their loss by the sale of other kinds. The electrical dealer, however, has neither the volume nor variety of business to justify so drastic a cut in price to produce marked increase in sales.

There is, moreover, another reason for avoiding stressing price reductions. Reductions in other fields have been much greater and any normal reductions in this field in minor appliances will seem petty in comparison, will seem like still holding the price up. In washing machines, even, the price reductions do not come all at once, and the heart of cut-price advertising is announcing the last drop in price, not some total drop.

Finally, the specialty man who has any real claim to consideration as an expert wants to get away from advertising and selling on a price basis. The sooner he gets to a quality basis the better. Compared to the service which money spent for electrical appliances brings, the service secured by money spent for other things will not show to advantage. And men should advertise the STRONG points of their business, in this case of service, not points such as price reduction in which they are excelled in other fields.

Advertising by Inside Display

Keeping unsightly things out of place and giving prominence to attractive things is one of the first principles of effective merchandising. Arranging these attractive things to add to the attractiveness of each other is equally important. Mere desire to arrange his store with these two things in mind will not suffice, but no one who works steadily on the job will fail to secure results which are a decided improvement on the best results he can hope to secure if he does not work steadily on the job.

Just the evident desire to please is a powerful factor in bringing people into your store. Place things with the idea of attracting the attention of customers and just a few simple rules of display will enable you to make your store at least presentable.

EDITOR'S NOTE

This is the third of a series of articles on this subject by Mr. Moriarty. The final article will appear in an early issue of the Journal of Electricity and Western Industry.

Dealers should use caution in displaying electric heaters in doorways adjacent to window displays where the range in temperature is great. The coefficient of expansion of the glass is such that the portion of the window nearest the heater expands to such an extent that the entire window is liable to crack. Similarly in cold weather, when the heater is turned off the sudden cooling of the glass is liable to cause a break.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Northwest Plant Progressing

Spokane River Project of Washington Water Power Co. Nears Completion

The Washington Water Power Company expects to complete its project for the development of 14,250 horsepower from the upper falls of the Spokane river in Spokane early in February at a cost of somewhat over \$1,000,000. The work was started a year ago this January. The company now has 90 men at work and during the summer months had from 250 to 300.

The upper dam by which water will be diverted into the south channel of the river to flow to the penstock has been completed and the gates are being installed. In the power house, the water wheel has been installed and the generator is being assembled. When this is completed, the water will be turned on for a series of tests to occupy the early part of February.

All of the machinery of the power station will be controlled from the Post street sub-station of the company, nearly two blocks distant. With the completion of this plant, the company will have a total of 136,250 horsepower available from its five plants, divided as follows: Long Lake 67,500 hp., Post Falls 15,000 hp., Little Falls 27,500 hp., Upper Falls 14,250 hp., Monroe street 12,000 hp.

New York Company Will Insure Electrical Machinery

Electrical machinery may now be insured as the result of an announcement made by the Travelers Indemnity Insurance Company of New York City. The company has announced that it is ready to issue policies to "indemnify the assured against loss or damage sustained by him on account of mechanical breakdown and electrical burn-out of the insured machines, accidentally caused." The general coverage is similar to that afforded under steam boiler and engine policies. For motors and generators the company requires for rate quotation the character of the current, the voltage, the capacity and the speed in r.p.m. For transformers the number of phases, the primary and secondary voltages and the capacity are required.

Men Start Work in Butte Mines After Months of Inactivity

With a total of 2000 men put to work in the mines in and around Butte, Montana, since these properties resumed activities on January 16, the effects of the financial depression in this district are believed to have worn off. Conservative estimates place the number of men now at work in the mines at approximately 5000.



New Fields for Illumination

Yosemite Valley is proving to be not only one of the great summer playgrounds in California but also for winter sports. Hundreds of visitors are enjoying its snowclad environs this winter. The sports are not confined to daytime alone for the toboggan course has been flood lighted in an effective manner.

The Anaconda Company has opened the Mountain View, Leonard, Badger State and Steward mines, while the Butte and Superior and Clark mines are on a one-shift basis.

In some of the mines repairs are being made at the present time and officials state that all of the big producers will be working shortly after the first of February. The Davis Daly mine is being completely electrified and electric ore trains will operate in place of the gasoline ones which were used preliminary to the shutdown nine months ago.

A total of six hundred men have been put to work at the smelter at Anaconda and trains have been bringing in quantities of ore from Butte for over a week.

Reclamation of 35,000 acres and ultimately of 15,000 acres additional in central Oregon will be undertaken immediately by Samuel Hill, former railroad and telephone operator, and a group of Oregon and Washington capitalists, operating as the North Canal Company, according to announcement to this effect made by Oswald West, attorney for the company. A reservoir of 160,000 acre-feet capacity, canals, etc., will be constructed in connection with the undertaking, which will cost in excess of \$1,000,000. A contract with the state obligates the company to sell the lands at \$75 per acre with water rights.

Shipping Combine Approved

Committee to Meet with U. S. Shipping Board Is Appointed

Negotiations with the United States Shipping Board over the purchase and allotment of the vessels which will make up the fleet to be operated by the \$30,000,000 shipping combine which has been proposed for the Pacific Coast will open early in February as the result of the meeting between representatives of the principal parts of this section held in San Francisco recently.

The plan met with the unanimous approval of the delegates to the sessions, and according to shipping men marks one of the most forward steps which have been taken in recent years to stabilize trade out of Pacific Coast ports.

The personnel of the committee which will handle the negotiations with the Shipping Board follows:

Herbert Fleishhacker, president of Anglo and London-Paris National bank, San Francisco, and vice-president of the Great Western Power Company.

Captain Robert Dollar, president Robert Dollar Company, shipping, San Francisco.

Kenneth R. Kingsbury, president Standard Oil Company of California, San Francisco.

Paul Shoup, president Pacific Oil Company and Associated Oil Company, San Francisco.

Harrison S. Robinson, attorney, Oakland.

William Piggott, vice-president Pacific Coast Steel Company, Seattle.

J. C. Ainsworth, president United States National Bank, Portland.

William Jones, capitalist, or John S. Baker, capitalist, Tacoma.

John D. Fredericks, president Chamber of Commerce, Los Angeles.

John D. Spreckels, capitalist, San Diego.

New Hydroelectric Development On Colorado Revealed

The copper interests of Arizona are credited as backing a \$30,000,000 hydroelectric project on Diamond Creek, a tributary of the Colorado River, according to an announcement made in southern California recently by R. U. Fitting, treasurer of the Parklap Construction Company of New York. The project is said to call for the generation of 600,000 horsepower, 150,000 horsepower of which is to be used by the copper interests and a portion of the remainder by the Santa Fe Railroad for the electrification of its lines from Winslow to Barstow, in accordance with plans which have been drawn up by the engineering interests which Mr. Fitting represents.

According to Mr. Fitting, the Diamond Creek dam would be 400 feet high and 1200 feet long at the top. He states that it would in no way interfere with the Boulder Canyon project which is being considered at this time by the Colorado River Commission in Washington, D. C.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

Every effort is being made by the Federal Power Commission to expedite issue of a license to the El Dorado Power Company so that it may start construction on its Upper American River project. The company, which is a subsidiary of the Western States Gas and Electric Company, advised the Commission recently that it is prepared to start construction immediately, and for that reason it is very anxious to secure a license at the earliest moment. The capacity of the project is 20,000 hp.

Muscle Shoals

After further conferences with Henry Ford, the Secretary of War has announced that he will submit the modified offer of Mr. Ford for the Muscle Shoals project to Congress in the very near future. Mr. Ford modified his original offer to the extent that he will agree to construct and complete dams No. 1 and 2, and will pay the Government as an annual rental of the property an amount equal to four per cent of the total cost of such construction.

The Construction Company of North America of San Francisco and the Newport Shipbuilding Company of Wilmington, N. C., are to submit more comprehensive offers for the property than those now on file. These offers will be submitted to Congress along with the Ford offer. A spectacular clash in Congress over the whole proposition is in prospect.

Patent Office Relief

By a vote of 305 to 44 the House of Representatives on January 12 passed the Patent Office relief bill. Due to the low salary scale in effect at the Patent Office, there has been a very heavy turnover among its technical personnel. This has had the effect of delaying the work until 60,000 applications have banked up and are awaiting action. The effect on industry has been nationwide and the demand for the legislation has been unusually widespread. The bill was opposed by House leaders on the ground that it establishes a precedent which sooner or later will have to be applied to 300,000 other employees of the Government. It was declared that the state of the public treasury is not such as to permit salary increases which in some cases amount to 50 per cent. Despite the influential character of the opposition, the bill was passed overwhelmingly. The Senate is preparing to take prompt action on the measure.

The Federal Power Commission has expressed its willingness to act on a valuation by the California Railroad Commission on the Kerckhoff plant of the San Joaquin Light and Power Company. The project is in operation, but the issue of a license has been delayed awaiting valuation.

An application for preliminary permit covering the important Grande Coulee waterpower on the Columbia river in the state of Washington has been filed with the Federal Power Commission by Col. Hugh L. Cooper of 101 Park avenue, New York. It is estimated that this project justifies the installa-

tion of 1,000,000 hp. An exhaustive report on this project was made by the State of Washington in its Columbia Basin report.

The whole subject of proposed revisions of the mining laws, which have remained practically unchanged since 1873, is to be taken up early in February at public hearings to be conducted by the Committee on Mines and Mining of the House of Representatives. Since there is widespread opposition to many of the suggested changes in the law, it is believed likely that the committee will decide, after the matter has been threshed out, to recommend the repeal of the Apex law insofar as it applies to future claims. There is no thought of making it retroactive.

When the joint committee of Congress makes its report as to the reorganization of the executive departments of the Federal Government, Senator Nicholson of Colorado, the author of a bill providing for the establishment of a Department of Mines, expects to arrange a hearing at which arguments in favor of such a department can be presented at the time the general subject is being discussed.

Despite the strong plea made by the gold mining industry before the Senate Finance Committee against any duty on cyanides, there seems to be strong sentiment on the committee for protecting the domestic cyanide manufacturing industry. This does not necessarily mean that there is controlling support for a duty as high as 33 1/3 per cent. Senator Smoot of Utah emphasized a statement to the effect that not to exceed five cents worth of cyanide was used to treat a ton of ore. The argument of the gold producers is that their industry can stand no more burdens at this time, and that a duty on cyanide will add hundreds of thousands of dollars to the cost of producing gold.

The carriers have completed their oral argument before the Interstate Commerce Commission in the matter of a general reduction in freight rates. It is quite generally agreed that they did not make a strong case. On the other hand, very strong arguments are being presented by representatives of the various commodities. While no reduction is likely to be ordered before April 1, it is anticipated that the Commission will order reductions at least as great as those provided recently for grain, on basic commodities. The reductions ordered on grain averaged sixteen per cent. Only slight reductions are anticipated for high-class freight.

The public utilities commission of Utah has decided to put into effect in that state the system of accounts for public utilities adopted by the National Association of Railroad and Utilities Commissioners. This means that gas and electric companies, which hitherto have not been required to file such annual financial statements with the Utah commission, will in the future be required to do so. The order is effective as of January 1 of the present year.

British Columbia Successfully Adopts New Rule of Road

The rule of the road was successfully changed to "Keep to the Right" in British Columbia at 6 a.m. January 1, thereby bringing the province into line with the rest of the North American continent. The change involved the greatest problem for the British Columbia Electric Railway Company, which operates the electric railway lines in and around Vancouver, Victoria and New Westminster. The change is expected to bring increased prosperity through the influx of automobile tourists hitherto reluctant to attempt to drive to the left.

Work was begun six months ago on the company's street cars, steps and openings being made on the right side of cars but temporarily boarded up. On New Year's Eve, the mechanical departments of the company at Vancouver and Victoria started to rip out these temporary partitions and tie up gates on the left side. With fifteen gangs of three to five men each, the entire rolling stock in Vancouver numbering more than 200 cars was changed by 7 o'clock on the morning of January 1.

At the same time, eight line crews started work on electric switches, frogs and trolley wires, working throughout the night. Track men had 125 distinct operations to perform on the mainland lines. Most of these were performed during the night previous to the change but some of the trolley wire adjustments could not be made until cars were actually operating.

An interesting phase of the matter is the activity in corner stores in Vancouver due to the change in car loading points. A dozen transfers of deeds or leases have taken place and in a number of other instances stores are to be remodeled. A rental firm in Vancouver stated that premises at a car loading point were worth 50 per cent more than otherwise.

Los Angeles Electrical Men to Continue Public Exhibit

The free public electrical exhibit which is being conducted in conjunction with the domestic science classes of the Los Angeles Express will be continued as the result of action taken recently at a meeting of electrical interests in the southern metropolis. Mrs. Kate Vaughn, writer and lecturer on home economics and domestic science, who directs the daily classes and demonstrations, reports an ever-increasing interest in electrical appliances which will remove the drudgery of ordinary housekeeping. Economy of operation and the concerted drive which the electrical interests are making to popularize these appliances is responsible for the interest being shown by housewives, she states.

The exhibit, which represents an investment of many thousands of dollars, was visited by more than 60,000 people during 1921. Demonstrations of every type and style of appliance were given daily. Actual figures secured through the cooperation of Mrs. Vaughn, show that a total of 1207 electric ranges were sold in Los Angeles during the past year. Most of the sales can be ascribed directly to the demonstrations given at the exhibit.

California-Oregon Power Company to Extend Lines

Construction of Extension Closes Last Gap in Interconnected System From Columbia River to Mexican Border

The California Oregon Power Company has announced that it has entered into an interconnection contract to supply power to the Mountain States Power Company for a period of thirty years, the power to be used throughout the rich and fertile Willamette Valley in Oregon.

In order to supply this power, the California Oregon Power Company will construct a 115-mile high tension transmission line of 110,000-volt capacity which will extend from the Prospect plant of the company through the Rogue River and Umpqua valleys into the upper Willamette valley where it will connect with the transmission system of the Mountain States Power Company at Eugene, Oregon.

This project stands out as one of the most important power developments of recent times, as it will close the last gap of the longest interconnected power transmission system in the world, extending from northern Oregon to the Mexican border.

Paul B. McKee, general manager, announces that plans are being prepared and that the construction of this power line will begin immediately. A number of construction crews will be started in the field at once, as it is planned to complete the work this year. The 115-mile transmission line will have a capacity of 25,000 horsepower. Although of 110,000-volt construction, the line at first will be operated at 66,000 volts and will connect at Eugene with the 60,000-volt line of the Mountain States Power Company.

This marks the first step in the major hydroelectric development of the California Oregon Power Company at Prospect, on the Rogue River. The new contract will facilitate and enable the development of the company's large power resources there, thus insuring a supply of dependable power ample to take care of the future needs of the Rogue River Valley and all of southern Oregon in advance of such needs. In other words, the Rogue River valley will have the benefit of hydroelectric development in advance of the need for power.

This interconnection to the north, together with the connection with the

Pacific Gas and Electric Company to the south, makes the California Oregon Power Company one of the most important links in the interconnection of power lines which now reaches from the Columbia River to San Diego and will eventually embrace the entire Pacific Coast.

The California Oregon Power Company's lines already extend from Gledale, in Douglas county, Oregon, 232 miles south to Kennett, in Shasta county, California.

Upon the completion of this new line north to Eugene, Oregon, the company's system will cover a territory extending 371 miles almost directly north and south.

Lumber Co. Protests Feather River Power Development

Protests on the part of the Hutchinson Lumber Company against the proposed hydroelectric development contemplated by Lars Jorgensen, San Francisco consulting engineer, on the Feather River in California, were heard recently before F. H. Fowler, district engineer of the U. S. Forest Service in San Francisco.

Engineers appearing for the lumber company stated that the proposed project would necessitate the re-routing of the Hutchinson logging road, construction on which is already well under way. It was pointed out that the road follows the most practicable route at the present time and that the cost of re-routing it would be at least half a million dollars. Alternative projects were suggested during the hearing, one of which was that the dam be constructed at the Middle Fork of the Feather River instead of upon the site now under consideration.

Improvement of Coos Bay on the coast of Oregon at an estimated cost of \$3,310,000 has been recommended by U. S. Army engineers in a report to Congress. The report recommends the construction of jetties and the dredging of a channel 150 feet wide and 22 feet deep. The money is to be spent at the rate of \$1,000,000 a year until the improvements are completed.

Terms for Sale of Timber Are Announced by Officials

Approximately 305,000,000 feet of timber in the Quinalt Indian reservation in Washington has been offered for sale by the bureau of Indian affairs, bids to be opened March 30, according to an announcement made by H. B. Steer, forest examiner at large for the Indian service, who has been at Aberdeen. The timber is about sixty per cent cedar and has been appraised at \$2.50 per thousand feet. Stipulations in the contract state that an initial deposit of \$15,000 must accompany each bid and that the timber must be off the land by March 31, 1935.

The District forester's office in San Francisco has announced the minimum stumpage rates which will be considered for the billion feet of timber which has been advertised in the Lassen National Forest near Eagle Lake in California, bids for which will be received until April 1. The advertised minimum rate is \$4 per 1000 feet for yellow pine, \$4.75 for sugar pine and \$1.50 for white and red fir, incense cedar and lodge pole pine.

Under the terms of the sale, only mature and over-mature timber can be cut and every protection must be given to young trees. The timber offered for sale comprises the largest single tract ever placed on the market by the forestry department.

The Port of Portland has purchased Swan Island, a large island in the Willamette river just below the center of the city, and will immediately begin the dredging of the west channel to a depth of 32 ft., using the dredgings to fill Guilds Lake and prepare the site for the immense union freight terminal of the Northern Pacific Terminal Company. The project not only embraces a big harbor improvement but provides a site for a much needed freight terminal to relieve the present congested yards. The total cost of the project will be several hundred thousand dollars.

Utah will begin a road construction program on March 1, 1922, which will amount to \$2,000,000, according to a statement made by State Engineer H. C. Means. In addition there is under consideration other jobs which will add \$475,000 to the total.



Seattle Engineers Move into New Clubrooms

The Seattle Engineers' Club moved into new quarters on January first, taking over the building formerly occupied by the College Club. The new clubrooms are located within a few blocks of the financial, business and theater districts of Seattle. The new building contains a lounging room, library, card and billiard room, dining room, committee rooms and twenty-

two bed rooms. The Seattle Engineers' Club is the fifth organization of its kind to obtain such club accommodations. Visiting engineers will now be able to secure sleeping quarters at the club should they desire. The Seattle club has a membership of 200 civil, electrical, mechanical, mining and chemical engineers.

Utah Utilities Commission Grants Rate Increase to Company

The Public Utilities Commission of Utah has granted an increase in lighting and power rates to the Dixie Power Company, operating in southwestern Utah, including St. George, Cedar City and intervening territory. The commission finds, in a majority decision, that to maintain the present schedule in effect on the Dixie Power company's system would be confiscatory. It does not, however, grant the company the full increase asked for.

For residence lighting the new rate provides a charge of 14 cents per kilowatt hour for the first thirty hours of monthly consumption; 11 cents each for the next 30 kilowatt hours, and 9 cents each for all over 60 kilowatt hours used per month.

The new commercial lighting rate is 14 cents for the first 30 kilowatt hours; 11 cents for the next 50; 9½ cents for the next 100, and 9 cents for all over 200.

A minimum charge for residence lighting amounting to \$1.39 per month is allowed, and for commercial lighting the minimum charge is \$2.00, both subject to a ten per cent discount for prompt payment.

Two schedules are allowed for municipal street lighting, one graded from \$2.15 per lamp per month for each 100 candlepower lamp to \$3.60 per lamp per month for each 400 candlepower lamp. The other, for multiple service, starts at \$1.15 per lamp per month for each sixty candlepower lamp and grades up to \$5 per lamp per month for each 400 candlepower lamp.

The cooking rate starts with 3.5 cents per kilowatt hour for the first 50 kilowatt hours and grades down to 1 cent per kilowatt hour for all over 1000 kilowatt hours.

No change is made in the present irrigation power schedule. For other purposes power may be furnished at 2300 to 11,000 volts at rates graded down from 10 cents per kilowatt hour for the first 100 kilowatt hours to 1.75 cents per kilowatt hour for all in excess of 8000 kilowatt hours. On service at 23,000 volts a demand charge of \$2 per horsepower of maximum demand, plus an energy charge ranging from 3½ cents down to 7 mills is allowed.

City of Tacoma Must Pay Higher Rate for Electricity

Notice of a substantial raise in rates for furnishing the city of Tacoma with electric current to help it over its overload peak periods of the winter, outside of possible emergency demands, has been served by the Tacoma Railway & Power Company upon the city. The new basis of charges would mean paying eight times as much as the city paid during 1921, it is stated. Commissioner of Light I. R. Davisson asserts that the action is another move to harass the city in its serving of the people and its attempt to develop additional electrical power at Lake Cushman. He states that he is prepared to contest the matter in court, to determine whether the company can suddenly interpret the contract for the mutual purchase of power, entered into in January, 1916, in a manner different from

League to Fight California Water and Power Act

Greater California League Is Organized in Northern California to Defeat \$500,000,000 Measure in November Election

Organized opposition to the state water and power act, which will appear on the ballot in the November election, has been begun by the Greater California League, which has launched its campaign against the proposed constitutional amendment which would place the water and power resources of the state under the control of a board of five politically appointed men and finance the development of these resources with state credit. The League is composed of prominent citizens drawn from every city and town in northern California.

In a preliminary statement which has been issued, the League announces that its "sole purpose is to defeat the proposed water and power act." This statement is signed by Eustace Cullinan, San Francisco attorney and president of the organization; John S. Drum, president of the Mercantile Trust Company of San Francisco and vice-president of the League; M. M. O'Shaughnessy, San Francisco city engineer; Percy V. Long, former city attorney of San Francisco; H. U. Brandenstein, former chairman of the finance committee

of the San Francisco board of supervisors; A. P. Giannini, and Matt I. Sullivan, former chief justice of the Supreme Court of California.

This statement points out that the proposed measure is unsound and dangerous and that it is an attempt to gamble with the taxpayer's money. The statement continues:

"The act pledges the credit of the state, and the property of the taxpayers, to issue a letter of credit for \$500,000,000, in the form of state bonds, bearing interest at the rate of not to exceed 6 per cent, to a board of five persons, whose membership is unknown, with instructions to the board to spend all or any part of the \$500,000,000 in the acquisition and development of such hydroelectric projects as it may choose to undertake, and to supply water and electric power to consumer at its own price, which need not be uniform."

The league points out that this board would be entirely outside the control of the State Railroad Commission, free to finance its projects in any way it saw fit, to charge whatever rates it desired and to render any quality of service it chooses. It further points out that the present system of public utility regulation is highly satisfactory for utilities and public alike.

that under which it has been accepted for several years.

The company, through its superintendent of power, K. C. Schluss, asserts that the company contracted to sell the city power up to 10,000 horsepower, only in times of failure of the city plant, due to scarcity of water, breakdown or other emergency. The city contends that the company agreed to furnish the power also at any time the city plant was for any reason unable to supply its customers. Notice of the raise in rates resulted in an immediate conference of electrical contractors, dealers and manufacturers, architects and builders in the city, who urged the city to maintain its present heating rates, and continue to give service if possible to those who have installed or are now planning to install electrical heating devices.

The status of the city's legal battle against the State Fisheries Board, in the plan to develop the Lake Cushman power project, will not be known definitely until next May or June, from present indications. Appeal from the decision of the lower court, which decreed that Tacoma could not legally condemn two certain tracts in the Cushman area because of interference with the Skokomish fish propagation, will not come before the State Supreme Court until the May or June term of the court.

The Mackay Telephone company has presented an unusual request to the public utilities commission of Idaho. The request is that the telephone company be permitted to lower its rates, retroactive to January 1, 1922. The company gives as a reason that by keeping its rates as at present it would lose more subscribers than would be lost by the 25 cents per month reduction. The commission asked the company to file a formal application for change of rates.

California Minerals for 1921 Show Increase Over 1920

Minerals produced in California during 1921 have been valued at \$244,856,910 by the statistical division of the State Bureau of Mines, is a report just made public. This valuation includes only the more important of the fifty or more minerals produced in commercial quantities in the state. The estimated total for 1921 is \$2,757,243 in excess of the production for 1920, due largely to increases in the amount of petroleum, gold and silver produced during the year just ended.

Petroleum leads the list in the value of the total yield. Approximately 114,000,000 barrels of petroleum were produced, bringing a total of \$182,400,000. Brick, cement, building stone, crushed rock and allied products were valued at \$27,000,000. Gold with a total production valued at \$15,800,000, shows an increase of \$1,500,000 over the preceding year. Salines, including borax, potash, salt and soda, were valued at \$6,500,000, natural gas at \$3,900,000 and silver at \$3,500,000. The amount of silver produced is greater than for any single year in the history of the state, with the exception of 1884. Copper, lead, zinc and quicksilver all showed material decreases.

at present facing domestic producers of magnesite, quicksilver, tungsten, chromite, manganese and talc, makes it necessary that a high tariff be placed on foreign imports of these minerals if domestic production is to continue.

One hundred dollars per month was taken from the salary of the manager of the electric department by the town trustees of Rupert, Idaho, when salary reductions were made which will reduce the expenses of governing the city approximately \$5500 annually.

Seattle Plans to Become Wool Center of the West

Washington Wool Growers' Association Starts Movement to Raise \$3,000,000 to Aid Industry in Adjacent States

In an effort to make Seattle a world-distributing center for wool, mutton and hides, nearly \$3,000,000 has been pledged by men identified with the industry in this district or members of the Washington Wool Growers' Association. The proposals made at a meeting in Seattle of the association are: That the Seattle Clearing House Association agree to advance up to \$2,500,000 per season to assist in the handling of wool and sheep products; that Frye and Company, packers, agree to invest \$150,000 in the construction of a large, modern wool warehouse in Seattle, with the sheep men to have a voice in its control and operation; that the Washington Wool Growers' Association form a \$100,000 corporation, so organized as to take advantage of the War Finance Corporation provisions to assist the growers in marketing their products.

The Port of Seattle has offered its giant port facilities to assist in every

way possible in the marketing of mutton and wool, including refrigerated storage. The trans-continental rail lines, with terminals in Seattle and steamship lines in inter-coastal, east-coast and trans-pacific service, offer to pledge refrigerated service and assistance in every way possible. The Seattle Chamber of Commerce has pledged its aid in the project.

Under the present program, sheep are to be brought to Seattle for clipping and slaughtering, and this arrangement will mean the enlargement of stockyard facilities. Wool and mutton will not only come to Seattle from Washington points, but from all sections of the Northwest, including Oregon, Idaho, Montana and Utah.

The Washington Wool Growers' Association recently completed a two-day convention in Seattle. Thomas Drumheller of Walla Walla is president of the association, and J. F. Sears of Prosser, Wash., is secretary-treasurer.

Pacific Gas and Electric Company Appoints New Officials

Appointment of four additional vice-presidents as a step in a reorganization program has been announced by the Pacific Gas and Electric Company, through Wigginton E. Creed, its president. The new vice-presidents are:

A. H. Markwart, former director of engineering, who becomes vice-president in charge of engineering.

W. G. Vincent Jr., former executive engineer, who becomes vice-president and executive engineer.

Willis S. Yard, former engineer of the gas department, who becomes vice-president in charge of gas construction and operation.

R. E. Fisher, former manager of the commercial department, who becomes vice-president in charge of sales.

These four officials with P. M. Downing, vice-president in charge of electrical construction and operation, and F. A. Leach Jr., vice-president in charge of public relations, will be directly responsible to John A. Britton, vice-president and general manager.

Electricity on the Farm Shown at Denver Stock Show

Emphasis on "electricity on the farm" was made by men in the electrical industry in Denver during the recent convention of stockmen from all parts of the United States. In conjunction with the National Western Stock Show, exhibits of every type of electrical machinery or appliances which might be used on the farm were displayed and considerable interest was shown by the visiting stockmen.

Particular stress was laid upon the use of radio phones as the result of concerted moves on the part of various interests in the Intermountain district to furnish weather reports, stock market quotations and news and entertainments. Various newspapers have led in this movement until a fairly complete service is being furnished.

Northwestern Company Files on Lewis River Site

The Northwestern Electric Company of Portland has applied for a preliminary permit for the development of power on the north fork of the Lewis river in the southwestern part of the state of Washington. The development will be carried out in three separate units. The first, and upper one, known as Swift Creek unit, involves the construction of a concrete dam 170 feet high, creating a reservoir of 160,000 acre-feet capacity. A tunnel about 10 miles long will lead to a power house where 25,000 horsepower will be generated. The Cougar creek unit consists of a diversion dam and a tunnel about six miles long to a power house developing 12,800 horsepower. The lower unit, known as Conditt site, consists of a concrete dam 200 feet high, creating a reservoir with a storage capacity of 200,000 acre-feet. A power house will be built at the dam which will develop 28,000 horsepower. The application for the preliminary permit is purely formal, as no immediate development is contemplated, the action being taken to protect the company's holdings of nine or ten years.

Deschutes Irrigation Project Is Subject of Protest

The Columbia Hydro-Electric League has filed a protest with the state water board against the appropriation of 500,000 acre-feet of water for the Deschutes irrigation project to be impounded in an immense dam at the headwaters of the Deschutes, on the ground that equal provision should be made for hydro-electric development. The league suggests that instead of making provision for impounding water for irrigation there should be stored at least 1,000,000 acre-feet to be equally divided between irrigation and water power. It is set forth that the farmer needs power for manufacturing and industry as well as water for his land. A hearing will probably be held on the matter.

Books and Bulletins

The Pacific Gas and Electric Company has issued a new booklet, "The Story of the Magic Pool," a compilation of articles on the Pit river development written for the San Francisco Call by C. E. Kunze, a member of the editorial staff of that paper. The articles deal with the power resources of the Modoc lava beds and of the hydroelectric project which the company will complete in that district during the coming summer. Numerous illustrations add to the beauty of the booklet.

The American Committee on Electrolysis has issued its 1921 report, superseding the report of 1916. The report contains such statements of facts, descriptions and discussion on electrolysis testing and mitigation as the committee has agreed upon unanimously. Arrangements have been made to place the book on sale through the American Institute of Electrical Engineers in New York.

The Robbins and Myers Company, Springfield, Ohio, has issued a booklet to dealers handling their products, entitled "A Breeze That Blows Profits Your Direction." The booklet contains sales and advertising helps on the electric fans manufactured by that company, as well as containing samples of the various types of literature furnished by them.

Westinghouse turbine generator units are described and illustrated in Circular 1094-B, just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This publication contains a discussion of the reactance and impulse types of turbines, both the semi-double flow type and the multiple cylinder type. Bleeder turbines and geared turbines are described, and each part of the turbine is elaborately treated.

The Pelton Water Wheel Company of San Francisco and New York has issued Bulletin No. 17, "Pelton Water Wheels (Impulse Turbines) and Reaction Turbines." The bulletin describes the various types of hydraulic equipment manufactured by the company, and discusses their application both to the generation of hydro-electric power and to the direct operation of many different kinds of machinery. Some space is also devoted to governors and to pressure regulating devices. The bulletin comprises forty-eight pages and is illustrated by a number of drawings and photographs. Copies may be obtained upon application to either office of the company.

San Francisco's purchasing power, as shown by the average amount of goods purchased per month during the last six months of 1921, exceeds that of any other city on the Pacific Coast and many of the larger cities of the U. S., according to figures which have been prepared by the San Francisco Chamber of Commerce. This purchasing power is placed at approximately three-quarters of a billion dollars per month. The figures show that one-fifth of California's wealth is credited to San Francisco.

Meetings of Interest to Western Men

Denver League Advisors Listen to Discussion of Trade

Good fellowship was the keynote of the monthly dinner meeting of the Electrical Co-operative League, which was held in Denver, January 12. Over a hundred were present and before the evening was over at least 15 of the members had been called upon to tell about their business, the economic problems confronting the industry, and the outlook for better business in 1922.

J. G. Berry, sales manager of the General Electric Co., was a guest and at the invitation of the chairman told of the observations he had made on his Western trip as to business conditions, which were of an optimistic nature.

Announcement was made at the meeting that Harry Randall, Denver manager of the General Electric Co., had consented to serve at the head of the committee which would have charge of displaying the electrical home when completed.

S. F. League Dedicates First Electric Restaurant

Men in the electrical industry in San Francisco dedicated the first completely electrified restaurant in the West when the San Francisco Electrical Development League met in the United Service Restaurant on January 16 for its regular weekly session. The meeting was one of the most noteworthy held by the League, as 325 members attended and many were turned away. E. O. Shreve, San Francisco manager of the General Electric Company, acted as chairman of the day, while the program included as speakers Mortimer Fleishacker, president of the Great Western Power Company; John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company; H. F. Jackson, general manager of the Great Western Power Company, and R. T. Ling, president of the United Service Corporation, owners of the restaurant.

The electrical industry of Aberdeen and Hoquiam, Washington, recently instigated a home-building program which will doubtless have important results in the Grays Harbor section of the Pacific Northwest. At a dinner get-together held in Hoquiam, January 18, sponsored by the Northwest Electrical Service League, about fifty lumbermen, realtors, building contractors and architects were guests of the local electrical contractors and dealers and the central power station company. The purpose of the meeting was to emphasize the need for close cooperation and harmonious understanding between all the various industries interested in the revival of building and to particularly stress the importance for the architect and builder to call into consultation early in his plans the electrical contractor.

Arthur H. Halloran, editor of "Radio," was re-elected president of the Pacific Radio Trade Association at the annual meeting held recently in San Francisco. Others elected at this time were Lieutenant Ellery Stone, Atlantic Pacific Radio Supplies Co.; vice-president, Max Loewenthal, Globe Commercial Co., secretary, and O. H. Miller, National Carbon Co., Harry Rathbun, Colin B. Kennedy Co., and E. T. Cunningham of the E. T. Cunningham Co., directors.

California Contractor-Dealers Meet in Sacramento

Decision to adopt a trade mark and discussion of renewable and non-renewable fuses were the chief features of the New Year meeting of Division One, California State Association of Electrical Contractors and Dealers, held in Sacramento on January 21.

The committee charged with selecting a trade mark was instructed to immediately adopt a design representative of the California State Association and place it in actual use. The mark will be used on stationery, membership cards and all other printed forms of the organization.

During the discussion of renewable and non-renewable fuses it was pointed out by members of an investigating committee which has been studying this subject that, although renewable fuses sold at fifty cents each and non-renewable types at twenty cents each, the renewable feature failed to justify the protection claimed by it. The report stated, "It would appear that the saving supposed to result from the use of renewable fuses is nothing more than a delusion."

Idaho Ruling Affects Bills of Political Subdivisions

According to a decision which has been rendered by the attorney general of Idaho, political subdivisions of the state are not entitled to the discount offered by utility corporations for prompt payment of bills when these bills are paid by warrant which is not good for cash until some future time.

The ruling is in the case of Madison county against the Utah Power and Light company. The county appealed to the public utilities commission for relief when the power company refused to allow the discount on presentation of a warrant to pay the bill. The commission asked the attorney general's office for an opinion in the case.

Upon receiving the above decision from the office of the attorney general, the commission added the following comment:

Under this situation we do not see any way in which we can compel the power company to allow a discount for prompt payment if payment is in fact not made at the time, and may not be made for a considerable time in the future. We appreciate that the county has no way of paying its obligations except by warrant, but those who receive the ultimate benefit of the service rendered, that is, the taxpayers of your county, are those who must supply the funds with which to make the warrants good. If they do not do this at such times and in such amounts as permit the warrants to be paid when presented, in view of the holding of the attorney general's office, the matter is not within our power to cure.

Thirty firms and individuals represent the electrical industry in the newly organized Association of Building and Construction of Oregon, abbreviated "A. B. C.," which was recently formed in Portland. The organization represents the various building crafts, the building public, labor and others interested in building and construction. Its purpose is to foster and organize proper educational facilities for those engaged in this industry with a view of elevating the standard of craftsmanship. Stephen I. Miller Jr., executive manager of the Northwest Electrical Service League, was one of the speakers at the organization meeting.

Welding Society Perfects San Francisco Branch

Organization steps for the San Francisco Section of the American Welding Society were completed at a meeting of men interested in this activity held at the Engineers Club, San Francisco, on January 13. At that time the following officers were elected: Professor J. C. Clark, Stanford University, chairman; H. L. Wintersgill, Westinghouse Electric and Manufacturing Company, vice-chairman; W. B. Sawyer, Jr., U. S. Steel Products Company, secretary, and K. C. Brackett, Air Reduction Company, treasurer.

The first meeting of the organization under the leadership of the newly elected officers will be held on February 17. Meanwhile members are making a drive to secure new members. At the present time twenty-six firms and three consulting engineers are represented on its rolls.

In response to the efforts of various San Francisco organizations, it has been announced that the 1922 convention of the International Association of Fire Engineers will be held in that city next fall. The Journal of Electricity and Western Industry was one of those who urged that the convention be brought to the West.

COMING EVENTS

MONTANA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Annual Convention—Butte—March 6-7, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

NATIONAL ELECTRIC LIGHT ASSOCIATION

Annual Convention—Atlantic City—May 15-20, 1922

William Piggott, president of the Pacific Coast Steel Company and of the Pacific Coast Car and Foundry Company of Seattle, was recently elected president of the Pacific Northwest Foreign Trade Conference. One of the most prominent financiers in the Northwest, Mr. Piggott is a firm believer in the policy of the commercial expansion of America by the development of foreign markets. When the 200 delegates from all parts of the Pacific Northwest met in Tacoma recently for the organ-



WILLIAM PIGGOTT

ization of a Foreign Trade Conference for that portion of the Pacific Coast, they were unanimous in their choice of Mr. Piggott as the man to lead this movement. Mr. Piggott was also one of the most active figures in the recent meeting in San Francisco for the formation of a \$30,000,000 shipping combine to operate the vessels of the U. S. Shipping Board in Pacific waters.

H. H. Courtright, general manager of the Valley Electrical Supply Company of Fresno, is in the Middle West attending the convention of Lighting Fixture Dealers and Illuminating Glass Kiln at Milwaukee, Wis. Mr. Courtright is making a special study of lighting fixtures, and to this end is also visiting centers in the Northwest, having discussions and conferences of contractor-dealer leaders in that territory.

George O. Muhlfeld, general manager of Stone & Webster Company, Inc., is now visiting in Japan, where an unusual amount of hydroelectric development is under way.

J. B. Brokaw has taken the position of manager of the La Grande division of the Eastern Oregon Light & Power Company, with headquarters at La Grande.

Charles H. Lee, formerly executive member of the California State Water Commission and chief of the Division of Water Rights, State Department of Public Works, has announced the resumption of his practice as a civil and consulting engineer, specializing in the development and utilization of surface and underground water, and water rights for irrigation, public water supply, power and other industrial uses. Mr. Lee has opened offices in the Holbrook Building, San Francisco.

H. D. Hawkes, sales manager of the Anaconda Copper Company, with headquarters at Great Falls, Montana, is a recent San Francisco and Los Angeles visitor.

Personals

S. L. Naphtaly has been elected vice-president of the Great Western Power Co. of California, and will be in charge of all of the activities and operations of that company. Mr. Naphtaly was born in San Francisco in 1875 and graduated from the University of California in 1896. Immediately thereafter he entered the electrical business, and in 1899 was manager of the Central Light & Power Co. of San Francisco. When this company was purchased by the San Francisco Gas and Electric Co. Mr. Naphtaly became assistant engineer in charge of the electrical department. In 1902 he was promoted to the position of manager of the electrical department and in 1903 general superintendent and chief engineer, which position he held until 1905, when the San Francisco Gas & Electric Co. was merged into the present Pacific Gas & Electric Co., at which time he became engineer of operations and maintenance of that company. In 1907 he left to become associated with the City Electric Co. of San Francisco, of which he was general manager and chief engineer. When this company was purchased by the Great Western Power Co. Mr. Naphtaly became general manager of the latter company and remained until 1913, when he resigned to complete the construction of the San Francisco-Sacramento Railway. He occupied the position of vice-president and chief engineer of that corporation. In 1917 he organized the Los Angeles Shipbuilding and Drydock Co., of which he was vice-president and general manager. That company built thirty-five steel ships for the government, and upon the completion of the work Mr. Naphtaly returned to the Great Western Power Co. to take his present position.

D. C. McClure, electrical superintendent of the Denver Gas and Electric Light Co., has been called to New York by the Doherty Company for a special conference concerning that company's operations in Denver.

Albert Sechrist, head of the electric manufacturing company of that name in Denver, is one of the directors of a drive which has been launched in that city to raise funds for the local Y. M. C. A.

F. A. Fellows, prominent electragist of Laramie, Wyo., recently visited Denver, and although the electrical home was not completed, he inspected it from top to bottom.

Sidney W. Bishop, executive manager of the Electrical Co-operative League of Denver, was recently elected vice-president of one of the largest American Legion posts in that city.

George Lewis, a Denver newspaper man, has been appointed executive manager of the Rocky Mountain committee on Public Utility Information, and offices have been opened at 302 Gas and Electric Bldg.

F. W. Roller, president of the Roller-Smith Co. of New York, is a recent visitor to San Francisco, where he spent several days previous to embarking for the Orient.

John J. Harrington, general manager and chief engineer of the Taikoo Dock and Engineering Corporation of Hongkong, arrived in San Francisco recently on his first visit to the United States. He will spend several months visiting the principal seacoast cities on both the Pacific and Atlantic coasts.

J. C. Boyle has succeeded J. C. Thompson as manager of the Klamath Falls division of the California-Oregon Power Company. Mr. Boyle has been in the engineering department of the company for a number of years. Mr. Thompson will take up more important work for the company, with headquarters in Medford.

Colonel Frederick J. Amweg, San Francisco civil and consulting engineer, will represent the Pacific Coast division of the American Association of Engineers at the engineering conference which is to be held in Chicago during February. Among the topics which are to be brought up for discussion at this meeting will be the standardization of fees for engineering services, license laws in the various states and other phases of engineering practice.

T. O. Kennedy, general superintendent of the Denver Gas and Electric Light Company, has been transferred from Denver to Cleveland, Ohio, where it is understood he will establish headquarters for the management of the Henry L. Doherty interests in that state. Since coming to Denver in 1917, Mr. Kennedy has been extremely active in campaigns for civic betterment, business development and the furtherance of the cooperative idea in the electrical industry. Consequently the announcement that he is to leave Colorado and the West means that the electrical in-



T. O. KENNEDY

dustry in the Intermountain district will lose one of its most active leaders. As chairman of the Denver Electrical Co-operative League, he has made unusual headway in bringing together all branches of the electrical industry. His vision and leadership will also be sorely missed by the Rocky Mountain Division of the National Electric Light Association, of which he was also chairman. The advisory committee of the Co-operative League and other representative business organizations in which he has been active tendered him a farewell dinner at the Metropole Hotel on January 23.

O. B. Coldwell, vice-president of the Portland Railway Light and Power Co., was a recent San Francisco visitor, where he spent some time in conference with California central station executives.

William Sproule, president of the Southern Pacific Co., has been appointed to the San Francisco Board of Park Commissioners. Mr. Sproule is an active figure in movements devoted to the civic welfare of San Francisco.

James H. Pohlms, chief engineer and general manager of the Port of Portland, is in California studying the operations of the electrically driven dredges in use in the harbors of this state preparatory to placing in commission the new electric dredge which has been added to the dredger fleet of the city of Portland.

Seymour I. Hess, former mechanical inspector for the U. S. Army Engineering Department, Wheeling, West Virginia, has joined the mechanical department of the Southern California Edison Co., with headquarters in Los Angeles. Mr. Ross is a former captain in the Coast Artillery Corps and is a graduate of Cornell University with the class of 1914.

A. E. Holloway, commercial superintendent of the San Diego Consolidated Gas and Electric Company, has been elected president of the San Diego Electric Club for 1922. After graduating from Purdue University in 1909, Mr. Holloway took the apprentice course of the Westinghouse Electric and Manufacturing Company, entering the employ of the San Diego company immediately after, becoming commercial superintendent a year later. In 1921 he took over the entire commercial activities of the company. During the time he has been in charge of the commercial



A. E. HOLLOWAY

department the company has experienced a remarkable growth, as shown by the number of customers, which has increased from 7300 to 30 000, and the power load, which has grown from 3300 to 30,000 horsepower. Mr. Holloway has been chairman of the industrial heating committee of the Pacific Coast Electrical Association, affiliated with the N. E. L. A. He also takes an active part in the civic and commercial life of the city, having been a director of the Chamber of Commerce and a city trustee of Coronado, where he resides.

Rex C. Starr, chief engineer of the San Joaquin Light and Power Corporation, has been named chief engineer of the Merced Irrigation District's \$12,000,000 project. It will be remembered that Mr. Starr was chief construction engineer on the Kerckhoff development of the San Joaquin Light and Power Corporation and later was at the head of the construction force which built the Kern river power house for the same company. Other engineering works in which Mr. Starr has featured in a major capacity are the Huntington Lake dam for the Southern California Edison Co. and the San Joaquin and Eastern Railway. This latter work was done while he was associated with Stone & Webster. Mr. Starr will not sever his connections with the San Joaquin Light and Power Corporation, but will merely transfer his construction organization to the Merced project, which will be completed by the time the power company is ready to begin construction on its Kings river development.

Atlee B. Saurman has been appointed general sales manager of the Standard Underground Cable Co., with headquarters in Pittsburgh. It will be remembered that during his twenty years of service with this company he spent twelve years on the Pacific Coast as district manager with headquarters in San Francisco.

H. B. Price, formerly advertising manager of the Belden Manufacturing Co., Chicago, has joined the advertising agency of George J. Kirkgasser & Co., Chicago. Mr. Price will specialize in technical and electrical advertising.

T. W. French has been named general manager of the National Lamp Works. Connected with the company between 1901 and 1913 in various capacities, he later resigned to become associated with the Peerless Motor Car Co., of which he was vice-president and general manager at the time he accepted his new post with the National Lamp Works.

W. H. Vance, vice-president of the Carmean Electric Co. of Kansas City, is spending two months on the Pacific Coast in the interest of his company. He is investigating industrial conditions in Portland, Seattle, Los Angeles and San Francisco with a view of establishing a western branch factory for the manufacture of motor-driven electric heaters to supply the Pacific Coast and Oriental trade.

Eustace Cullinan, attorney-at-law, with headquarters at San Francisco, has been elected president of the Advisory Committee of the Greater California League. The purpose of the Greater California League is to defeat the proposed Water and Power Act to be placed upon the ballot of California in the fall of 1922. The act calls for the appropriation of approximately \$500,000,000 to be used for the municipal development of power under a hydroelectric Commission of five men with extreme powers. Mr. Cullinan is a graduate of the Hastings College of Law of the University of California, and for many years has been associated in all forward movements in the state of California which look toward the protecting of the state's best interests.

W. H. McGrath, vice-president of the Puget Sound Light and Power Company, was a recent San Francisco visitor.

H. C. Hopkins has resigned as head of the promotion and advertising divisions of the San Francisco office of the Westinghouse Electric and Manufacturing Company to assume active partnership in the advertising firm of Dolman & Hopkins. For the past fifteen years Mr. Hopkins has been associated with the Westinghouse Company in the manufacturing, sales, advertising and sales promotion departments. During the four years of his association with the electrical industry in San Francisco he



H. C. HOPKINS

has been unusually active in contractor-dealer movements and other trade association activities. He has been a prominent member of the San Francisco Electrical Development League and has completed two terms as publicity chairman for this organization.

C. Humphries, of the Mogul Company, New York, recently reached San Francisco from an extended tour of the Orient and is now investigating Western market conditions before returning to the home office of his company.

G. E. Emmons, vice-president and manager of works, and J. G. Barry, general sales manager of the General Electric Co., with headquarters at Schenectady, N. Y., are both recent Pacific Coast visitors.

J. G. Berry, general manager of the General Electric Company, addressed a meeting of the Electrical Co-operative League in Denver recently.

Obituary

Charles F. Schneider, general factory superintendent for the Robbins & Myers Company, died in Springfield recently. His death occurred shortly after his arrival at the plant on the morning of January 12. He entered the employ of the company in 1897 and rapidly rose to an executive position. His loss is keenly felt by his co-workers in the industry.

John M. Klein, one of the pioneers in the electrical jobbing field in San Francisco, died recently. The founder of the jobbing firm which bore his name and which was later taken over by the present Pacific States Electric Company, Mr. Klein had been retired from active participation in the industry for several years. His loss will be keenly felt by a host of friends and associates on the Pacific Coast.

S. A. Meyers, manufacturer of safety switches, race way cabinets and cut-out boxes, announces that the Meyers Electric Switch Company is now located at 575 Howard Street, San Francisco. Increased production and additional manufacturing facilities have made possible reductions in prices in the Meyers products, according to the announcement.

The Carmean Electric Company, Kansas City, Mo., manufacturers of Carmean motor driven electric heaters, has established distributing agencies on the Pacific Coast for the outlet of its products in the West and in the Orient. The California Electric Heating Company will establish offices and salesrooms in Los Angeles and San Francisco as distributors of Carmean products for California, Nevada, Utah and Arizona. The Goodman Electric Company of Tacoma, Wash., will open offices and salesrooms in Portland and Seattle as distributors for Oregon and Washington.

The Cahill-Vensano Company, San Francisco contracting engineers, announces that except with regard to the uncompleted contracts and unfinished business it has dissolved partnership. It will, however, complete all existing contracts and unfinished business, maintaining its old address of 110 Sutter Street. John R. Cahill and Edward G. Cahill have formed a co-partnership under the name of Cahill Brothers, and will engage in general contracting in the offices now occupied by Cahill-Vensano Company at 110 Sutter Street. H. C. Vensano will engage in the general contracting business under the name of H. C. Vensano & Company, with offices at 58 Sutter Street, San Francisco.

Arthur B. Lakey, sales engineer for the Kingsbury Machine Works, with headquarters in San Francisco, is being congratulated upon the fact that the thrust bearings manufactured by his company have been installed in the record-breaking 55,000-horsepower turbine put into operation in the Chippewa plant of the Hydro-Electric Commission of Ontario, Canada, near Niagara Falls, on December 28, 1921.

The Westinghouse Electric and Manufacturing Company has issued descriptive leaflet No. 3443, describing its new luminous top holder socket reflector. Interchangeability of parts, simplicity and ease of wiring are among the advantages claimed for these new reflectors.

The Northern Radio and Electric Company of Seattle recently moved its retail establishment from 418 Union Street to 606 Pine Street, where new and enlarged quarters will better enable it to cope with its growing trade.

R. W. Cramer & Company, 136 Liberty Street, New York City, has introduced to the American market from Switzerland the Sauter time switch, the newest development in automatic current control. This new line includes a self-winding type of switch which, it is claimed, can be sealed and left unattended for six months, at the same time automatically adjusting the moment of operation to conform with the seasonal change in the time of dusk and dawn.

The Cutler-Hammer Manufacturing Company, Milwaukee, has moved its Boston office from the Columbian Life Building to the Harvey Building. C. W. Yerger is manager of this office.

Manufacturer, Dealer, and Jobber Activities

The P. A. Geier Company, Cleveland, Ohio, is distributing a new folder on the profitableness of the Royal electric hair cutter for the shop of the progressive barber.

The Wells-Morris Manufacturing Company of San Francisco has just developed and placed on the market a new and novel electric waffle iron. The dominating features of the new device are that it turns out a round waffle that fits the plate and that a newly patented hinge at the rear of the iron makes the current connection to the top heating element. The new iron is firmly secured to a tray which forms the base, and the entire appliance is nickel-plated and highly polished.

Dolman & Hopkins, advertising specialists of San Francisco, have taken new and larger quarters in the New Call Building. The firm now occupies suites 336 and 338.

The Rutenber Electric Company, Marion, Ohio, manufacturers of electric appliances, announces the appointment as vice-president in charge of sales of J. D. A. Cross, for the past twenty-six years connected with the sales organizations of the General Electric Company and the Edison Electric Appliance Company. At the same time the company announces that it has adopted the trade name "Marion" for all of its products.

The Delta-Star Electric Company, Chicago, has issued a sixty-four page booklet, No. 37, devoted to outdoor substations of all voltages up to and including 66,000 volts. The booklet contains descriptive matter on substation equipment assemblies and is replete with illustrations of substations in commercial service.

The Appleton Electric Company, Chicago, manufacturers of conduit fittings, has taken over the Anderson Electric and Equipment Company of Chicago. The new company will continue to manufacture and market the Anderson line of equipment.

The Edison Electric Appliance Co. has placed J. F. Senior in charge of the range and oven business of that company in the Rocky Mountain region with headquarters in Denver.

The Cutter Company, Philadelphia, has issued a new bulletin describing Ure-lite circuit breakers. The booklet is replete with illustrations of commercial applications of this type of equipment.

The Sangamo Electric Company, Springfield, Ill., has issued circular No. 59, describing the Brooks two-stage current transformer manufactured by that company. The new transformer is for use with watt meters and watthour meters in making accurate load determinations.

The Steel City Electric Company, Pittsburgh, manufacturers of electrical specialties, has sent out a circular letter to approximately 200 trade advertising agencies and electrical manufacturers calling attention to the necessity of emphasizing the convenience outlet idea to aid in popularizing the use of electrical appliances.

The Ridgway Dynamo and Engine Company, Ridgway, Pa., has issued booklet No. 30, describing its line of motor-generator sets. The booklet is particularly interesting in view of the increasing application of electricity to industrial purposes. The booklet is completely illustrated.

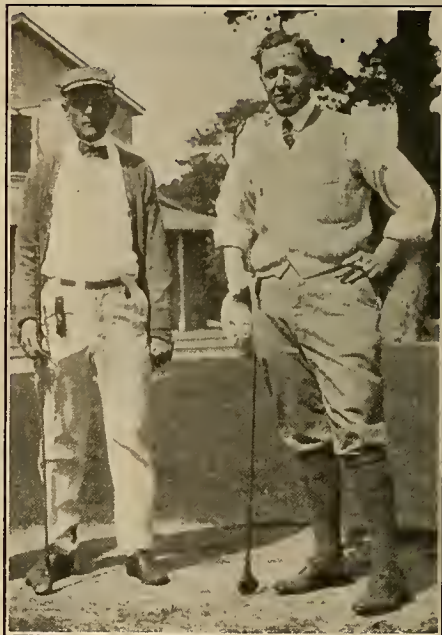
The Laundryette Manufacturing Company, Cleveland, in the current issue of the "Dryer," under the heading of "Changing People's Habits Hard in 1826," points out the manner in which habits have changed since the inception of the various types of electric appliances.

The Foulkes Electric Company, Los Angeles, was awarded the contract for the electric installation at the Exposition Park Stadium to be built in that city. The contract which approximates \$20,000 will represent the most complete application of electricity to outdoor theaters and stadia in the West.

The Hendrie and Bolthoff Company, one of Denver's largest jobbers, received first prize in the class in which it exhibited a six-horse team of draft percherons at the 16th annual Western Stock Show held recently in Denver.

The Waage Electric Company, Chicago, manufacturers of heating devices, has just published new price lists showing material reductions. According to officials of the company prices are practically to the pre-war level and in some cases lower. An electric percolator and an electric curling iron have recently been added to the company's line of appliances.

The offices and warehouse of the Gillespie Eden Corporation in Denver have been closed and the Rocky Mountain territory placed under control of the St. Louis, Mo., branch. Norman Olson, former division manager, will still cover the territory.



AGE LENDS ENCHANTMENT

The exact length of time which this picture has been extant is hard to judge. Anyway it is on the "old" course at Del Monte in the days when there was a nineteenth hole. It is proof of the fact that K. E. Van Kuran, Los Angeles district manager for the Westinghouse Electric and Manufacturing Company, and C. B. Hall, secretary-treasurer of the Illinois Electric Company, should play a good game by this time.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting
Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

The attention of the Pacific Coast has been riveted on the meeting here which had as its purpose the organization of a \$30,000,000 shipping combine. In all likelihood the merger will be effected as shipping interests and capitalists are solidly behind the movement. The Twelfth District Federal Reserve Bank has risen from sixth to third place among like organizations of the nation, giving rise to the belief that this district will not suffer from the financial depression which has been slowly radiating westward from eastern industrial centers.

Building permits for San Francisco and the surrounding district continue to mount. In Oakland, the transbay industrial city, permits show a gain of 248 per cent over the corresponding period last year. A severe cold spell has done some damage to early vegetable crops in the outlying agricultural districts.

LOS ANGELES

The past two weeks have been disheartening owing to a cold spell which has irretrievably damaged the citrus crop, the loss being estimated variously from twelve to eighteen million dollars. However growers feel that they will recoup somewhat from the high prices which will result from the shortage.

Building permits for January are estimated to be slightly in excess of six million dollars, a drop of one-third from the high mark set during December.

The municipal water power bonds, the sale of which to the Hellman interests was recently held up by the court, have been sold to a local syndicate at a premium of approximately \$450,000, the \$13,500,000 issue bringing a price equivalent to \$103.337. However difficulty has been experienced in disposing of a smaller issue of library bonds.

There is considerable activity in the oil industry, several new wells having been brought in during the past two weeks.

SPOKANE

1922 has started most auspiciously, much more so than did 1921. There is a sentiment of optimism in existence much different from the feeling of uncertainty, doubt and worry which ushered in last year. Even the cold snap prevalent the middle of January has not sufficed to affect the general feeling of uplift.

The mining business which has likewise been in the doldrums, with Butte shut down practically all of last year and the Coeur D'Alenes with only part of the properties in operation and these with curtailed production, gives signs of life. The copper mines of Butte are to resume shortly and while no definite

announcements have come from the Coeur D'Alenes, larger activities are confidently expected in that district this year and there is a much better feeling among the mining fraternity.

The Great Northern railway company has just called for bids for the double tracking of a portion of its track west of here and the highway work to be done by the states of Washington and Idaho, the federal government and the various counties tributary to Spokane will run at least from three to six million dollars. There is no feeling of boom in the air but just of normal healthful business development, pleasurable because of contrast with the 1921 depression.

SEATTLE

The twenty-four Seattle banks reporting to the Comptroller of the U. S. Currency, Washington, D. C., and the Washington state banking department, Olympia, following the call for statement of condition as of December 31, 1921, show aggregate deposits of \$136,307,677.28, as compared with \$131,434,677.28 under the call of September 6, 1921, a gain of more than \$5,126,000 in less than four months' time. This is the first time since the inauguration of the era of post-war deflation early in 1920 that the bank deposits and resources of the financial houses of Seattle have shown a strong upward trend.

By placing contracts for 4,500 new freight cars, and specifying that all the lumber used in their construction must be purchased on its own or tributary lines in this territory, the Union Pacific railroad will give the sawmills of the Northwest orders for nearly \$1,000,000 worth of carbuilding materials in the next few months.

Ratification of the program for limitation of naval armaments as proposed by the conference in Washington, D. C., will increase rather than decrease activities in the Puget Sound Navy Yard, Bremerton, Wash., which has been developed primarily as a repair and overhaul, and not as a construction base. The last naval appropriation bill carries \$1,421,000 for the Bremerton base, of which \$716,000 is for an extension to pier 5, \$250,000 for seawall building and \$200,000 for a 50-ton drydock crane.

SALT LAKE CITY

Bankers report that the demand for money is not pressing, and what is asked for is for investments that may be liquidated within a short time. This is the slow season of the year, and the financial stringency is also still in effect, which accounts for the fact that business among the retailers is rather quiet.

Building prospects, however, in Salt Lake City are brighter now than they have been at any time in the past three

years, and it is expected that many new homes will be under construction just as soon as weather conditions permit.

Mining conditions are good, except in the copper camps such as Bingham. However, with the opening of the Butte mines it is expected that the time is not far off when the copper mines of Utah and other sections of the intermountain country will resume operations.

PORTLAND

Business, as predicted, is a little quiet following the holiday season. Retail business has been stimulated by clearance sales chiefly in wearing apparel. Jobbing orders are better than anticipated, showing that retailers' stocks have become much depleted, both in the country and city.

Bank returns issued in response to the call of the Controller of the Currency indicate that the period of shrinkage in deposits is drawing to a close. Enough lumber business is in sight from the railroads, eastern industrial centers, and the Orient, to tax the producing capacity of the mills in the Northwest during the early months of the year. Failure of wheat prices to advance prevents a free selling movement in the country and at the same time dealers are not inclined to take on supplies in view of the backward European and Oriental demand. Approximately 100,000 boxes of Oregon apples will be shipped on refrigerator steamers to England this month. A number of large buildings are under construction and many more are projected and 1922 promises to be very active in building construction. Electrical business in common with other lines is rather quiet, but the outlook for the early spring and remainder of the year is very encouraging.

DENVER

Contrary to general expectations, business during the first month of the new year showed unusual strength. After-holiday buying resulted in the movement of a large amount of staple merchandise but this condition was not reflected in the sale of electrical appliances. However, the general situation has given a tone of optimism to the outlook for the next couple of months.

Electrical jobbers still report a slow movement of stock with the possible exception of house wiring supplies. Fair weather has helped to keep building operations open and the unemployment situation is not any worse than it was 30 days ago.

Local banks report unusually large clearings for the month and this is believed due to the sale of cattle and other animals at the annual live stock and horse show which brought a large number of visitors to this city about the middle of the month.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

LEAVENWORTH, WASH.—The city council is considering building an electric light and power system, it is reported.

SEQUIM, WASH.—The Sequim Light & Power Company of Sequim recently filed amended articles of incorporation, increasing the capital stock from \$3500 to \$50,000.

BANDON, ORE.—The city of Bandon is now receiving electric service from its new \$110,000 hydro-electric plant on Willow creek, about 20 miles from the city.

EUGENE, ORE.—The city of Eugene has filed on a power site for future development to serve the needs of the city when the present municipal plant has reached its capacity.

PORTLAND, ORE.—The city of Portland is considering the installation of a wireless system for the use of the police department such as is used in some of the eastern police departments.

LA CENTER, WASH.—The town now has electric lights for the first time in its history. Service is supplied over a transmission line erected by the Ridgefield Light & Power Company.

KLAMATH FALLS, ORE.—The box factory of the Pelican Bay Lumber Company, the largest mill in this section, was recently opened. The mill employs 60 men and will cut 80,000 ft. of lumber a day.

WALLOWA, ORE.—The 1,200-hp. hydro-electric Enterprise Electric plant, located at Wallowa Falls, was placed in service during the latter part of December. The cost of the project was about \$100,000.

CANBY, ORE.—The city council of Canby has passed an ordinance submitting to the taxpayers a proposal to issue bonds in the amount of \$10,000 for the purpose of installing a municipal light plant. The election will be held in February.

WENATCHEE, WASH.—Fifteen thousand acres of Grant county land is to be placed under irrigation this season by use of electric power for pumping the water from wells and from Moses lake, according to information coming from that section.

VANCOUVER, WASH.—Application for a 50-year franchise has been made to the city by the Lewis River Hydro-Electric Power Company, which was organized in May, 1921, for the purpose of furnishing light and power and eventually water to the city of Vancouver.

SEATTLE, WASH.—The B. T. U. Mills Company, L. C. Smith building, Seattle, recently incorporated with capital of \$100,000, and will immediately erect a \$30,000 feed mill on the south side of Lake Union canal in Fremont. George E. Baldwin is president of the company.

GRESHAM, ORE.—The Portland Railway Light & Power Company is installing a new high tension transformer substation at a cost of \$10,000, which will be supplied with service from its River Mill 60,000-volt transmission line, to give the city a more adequate and reliable source of light and power service.

PORTLAND, ORE.—The Albina Electric Company, whose place of business is located at Mississippi avenue and Shaver street, Portland, has filed articles of incorporation, with W. D. Williams, L. G. Roach and A. E. G. Karr as incorporators. The business which has been established for more than a year is to be enlarged.

SEATTLE, WASH.—The Board of Public Works, Seattle, has approved an ordinance authorizing the installation of street lights, including approximately 280 arc lights, in various residential sections of the city. The installation will approximate an expenditure of \$25,000.

VANCOUVER, WASH.—It is reported that the newly incorporated Pacific States Rubber Company will be located in this city, providing a suitable site can be secured, and a plant to cost \$500,000 will be erected. The company will manufacture tires and tubes and later a full line of rubber goods. A. M. Elliott is president of the new company.

PORTLAND, ORE.—It is reported that the immense Eccles timber tract in the northwestern part of the state will be opened up by the terms of a contract recently entered into between the Great Northern and Northern Pacific railway companies and Charles Keith, owner of the tract. It is said that the construction of a lumber mill with a capacity of 250,000 ft. daily is assured.

SEATTLE, WASH.—To care for increasing business in Seattle and western Washington, the General Petroleum Corporation of California will immediately spend \$100,000 in additions to its oil terminals on Harbor Island in Seattle. The improvements planned include two 55,000-barrel steel tanks for fuel oil; two 10,000-barrel steel tanks for gasoline; and one 500-barrel tank for distillate. The Harbor Island tank station, as it now stands, represents an investment of \$600,000.

THE PACIFIC CENTRAL DISTRICT

NEWMAN, CAL.—The National Ice Cream Company will erect a new plant here in the near future.

SUSANVILLE, CAL.—At a recent election bonds for \$50,000 were voted for the Susanville school district.

OAKLAND, CAL.—A five-story concrete addition is contemplated to the Prince Canning Company's plant at 20th avenue and E. 10th street, to cost \$75,000.

MARYSVILLE, CAL.—The Virden Packing Co. has awarded a contract for the erection of a \$250,000 plant to the McGillivray Construction Co. of Sacramento.

NEWARK, CAL.—The James Graham Manufacturing Company, manufacturers of stoves and fixtures, is planning the erection of a reinforced concrete building to cost \$50,000.

NAPA, CAL.—The Napa Valley Ice & Storage Co. is contemplating the erection of a \$75,000 plant in this city. A station will also be located at St. Helena and one at Calistoga; also one each at Vallejo, Fairfield and Vacaville.

FRESNO, CAL.—Plans have been announced by H. Myers, vice-president of the A. Meister Sons Company of Sacramento, for the opening of a plant in this city where electric and gasoline street cars, auto bodies and tops will be built. The new plant will represent an outlay of approximately \$150,000.

SAN FRANCISCO, CAL.—H. Bardue, vice-president and general manager of the Direct Steel Process Company, with offices in San Jose and an experimental plant in Alameda, was recently in San Francisco to negotiate the financing of a producing plant in or adjacent to San Francisco with a capacity of 400 to 500 tons of steel per day.

SANTA ROSA, CAL.—Walter Proctor has been awarded the contract for building Grace Bros.' new ice plant, which will be constructed of steel and reinforced concrete.

MARTINEZ, CAL.—The California Car Company, manufacturers of motor-propelled railroad cars, has purchased six acres of land near Muir Station, where work on the construction of the first unit of buildings for its plant is being started.

NAPA, CAL.—The California Prune and Apricot Growers' Association is planning the construction of a \$100,000 plant in this city, according to Henry Wheatley, Napa representative. Four graders will be installed and a double processing used.

MERCED, CAL.—The Merced Concrete Pipe company has signed a contract with the State Land Settlement Board at Delhi for furnishing material and labor required to install a 36-mile concrete pipe irrigation system. The size of pipe to be used in the system is from 8 to 30 in.

YREKA, CAL.—The office of the Klamath National Forest has received plans and specifications for the \$75,000 wagon bridge to be erected over the Klamath River between Happy Camp and the mouth of the Salmon River. The bridge will be a single span of 309 ft. 10 in. and will contain 245 tons of structural steel.

OAKLAND, CAL.—The Pacific Gas & Electric Company has started construction on its Claremont substation, located on the north shore of Lake Temescal, south of the Tunnel road. The building will be of steel and concrete and completely equipped with electrical machinery. The entire cost is estimated at \$250,000.

SAN JOSE, CAL.—H. C. Dunlap, secretary of the California Prune and Apricot Growers' Association, has announced that the purchase of a site for a branch packing plant at Colusa has been authorized by his company. The site agreed upon is located near the Southern Pacific station, where it may be reached by both Southern Pacific and Sacramento Northern Railroad tracks.

PLACERVILLE, CAL.—Announcement has been made by the El Dorado Water Company management that a storage reservoir on Webber Creek will be constructed to provide water for irrigation purposes. The dam will be 120 ft. high. Estimated cost is \$250,000.

TURLOCK, CAL.—At a recent meeting of the Chamber of Commerce, Chas. Northcutt, division manager of the Pacific Gas and Electric Company, announced that his company has made an appropriation for extensive reconstruction of the electric service to Turlock. The plans call for a new 60,000-volt transmission line from Modesto to Hughson, a new substation at Hughson and the rebuilding of the Turlock substation.

THE INTERMOUNTAIN DISTRICT

NAMPA, IDAHO.—The city of Nampa is investigating the cost of installing and operating a municipal electric light plant.

PUEBLO, COLO.—A new state armory to cost \$65,000 will be located at the state fair grounds. Contracts have been let and construction will start immediately.

LAMAR, COLO.—Bids were opened by Architect J. J. Huddart of Denver, January 23, for the construction of a state armory here to cost in the neighborhood of \$50,000.

PRICE, UTAH.—The city of Price is contemplating many improvements for the coming year, among which are a number of power and light extensions and improved street lighting on Main street.

COLORADO SPRINGS, COLO.—The immediate construction of a \$400,000 municipal auditorium is now assured through the sale of the complete bond issue to a Denver brokerage firm at a premium.

DENVER, COLO.—Martin Beck, president of the Orpheum vaudeville circuit, has announced that a new "junior" playhouse will be erected by his company shortly and will be ready for the fall opening.

DENVER, COLO.—Henry I. Seeman has completed plans for a four-story apartment building which will cost \$100,000. It will be located in the exclusive residence district and will be ready for occupancy by September 1.

DENVER, COLO.—The C. S. Lambie Company has been awarded the contract for the construction of the first \$100,000 unit of the Super-Service Motor Association, which is sponsoring a co-operative auto repair factory in which a number of prominent local men are interested.

VIRGINIA CITY, NEV.—A mine plant costing about \$130,000 is to be installed near the portal of the Hale & Norcross tunnel, according to announcement by the management. Approximately \$150,000 will be expended on development work at the Middle Mines group.

SALT LAKE CITY, UTAH.—George W. Davy of Salt Lake City has filed application with the state engineer for the use of 25 sec.-ft. of water from the Otter Creek or Daniels Creek in Sevier county, to be used in developing 1400 hp. of electrical energy. Plans contemplate developing this horsepower under a head of 724 ft. for use in Sevier, Emery and Wayne counties.

TONOPAH, NEV.—The completion of four buildings at the West End Chemical Company's borax mine, 26 miles from Las Vegas, means that the company now has adequate facilities for housing its men and offices. Major Luckhardt stated that in about four months the company's mill will be completed. This mill will be built at the mine and not at Nye station, as reported.

THE PACIFIC SOUTHWEST

SAN PEDRO, CAL.—Pacific avenue will have an ornamental lighting system from Third street to Fourteenth street. The contract has been awarded to the H. H. Walker Company of Los Angeles for \$18,297.

TROPICO, CAL.—C. L. Peek has the general contract for the mausoleum to be erected for the Forrest Lawn Cemetery. T. Patterson Ross of San Francisco is the architect. The cost will be \$300,000.

SAN DIEGO, CAL.—The new Mission Valley detention home will be built by Contractor R. A. Jackson for the sum of \$32,225. Contract awarded by the county provides for immediate opening of the construction.

NATIONAL CITY, CAL.—State Harbor Commission has received the application of the California Gypsum Company for a lease on 40 acres of tidelands on which to erect a gypsum factory. The cost is estimated at \$250,000.

LOS ANGELES, CAL.—The Board of Harbor Commissioners has awarded to the United Dredging Company of Los Angeles a contract for dredging the harbor, contract price, \$243,904. A concrete wharf to cost \$250,000 will be built by the city and leased to the Vegetable Oil products Co. when completed.

SANTA ANA, CAL.—A large concrete public garage will be erected for Knox & Stout at 522 N. Main street. The contract has been awarded to Ross & Ritchie of Long Beach for the sum of \$60,000. E. M. Fraser is the architect.

LOS ANGELES, CAL.—Articles of incorporation have been granted to the Imperial Cotton Mills Company authorizing the issuance of \$1,500,000 in stock. All of the directors are in Los Angeles. Jefferson P. Chandler is attorney for the company.

FULLERTON, CAL.—Contract for the new high school was awarded to Edwards, Wilkey & Dixon of Los Angeles. The bid was \$184,500. Reed & Farley were awarded the electrical work at \$10,850. The group of buildings will be connected by a system of arcades.

ONTARIO, CAL.—Work on the new city fire hall will begin at once following the contract made between the city and Campbell Construction Company of this city. The permit calls for \$25,000. The building will be erected at the corner of Euclid and Transit streets.

LANCASTER, CAL.—The Antelope Valley union high school will cost \$184,000, according to contracts which have been signed with Wop-schall Bros. of Pasadena. Architect John C. Austin advises that work will be started during January or February.

TURLOCK, CAL.—The bids for the cement for the Don Pedro dam, amounting to 100,000 bbls., were accepted and the Old Mission Portland Cement Company of San Juan Baptiste was given the contract at \$2.19 per bbl. f. o. b. plant. All bids for steel were rejected.

SAN PEDRO, CAL.—Pacific Coast Borax Company, through its local representative, has purchased a 9-acre tract of land from the Chandler Shipbuilding Company on which it proposes to construct a borax plant. The site is adjacent to Los Angeles harbor.

SAN PEDRO, CAL.—The United Dredging Company was successful bidder for the removal of 2,060,000 yards in the east and west basins of the harbor. The contract was referred to the city attorney for approval. The price stated in the bid was \$243,904.

LOS ANGELES, CAL.—William Davidson, chief county mechanical engineer, is preparing plans for the additions to the Museum and Art building at Exposition Park. The buildings will be of class A construction, with steel frame and tile roofs. The cost is estimated at \$400,000.

BURBANK, CAL.—Architect Richard D. King is taking bids for the group of buildings to be erected for the American Aluminum-Metal Products Company. The seven buildings will have brick walls, composition roofs, and steel sash and skylights.

LONG BEACH, CAL.—Loy L. Smith is preparing plans for the 12-story hotel to be erected opposite the municipal park for the Park View Land Company. The hotel will have 325 guest rooms and 10 stores on the ground floors of the Pike and Ocean avenue frontages. The cost is estimated at \$800,000.

LOS ANGELES, CAL.—The L. A. Automotive Company has contracted with the Moran Company for the erection of its new factory building, for the assembling of electric commercial trucks. This unit will be a structural steel building with saw-tooth roof and approximate dimensions of 250 ft. by 50 ft.

LOS ANGELES, CAL.—Seven hundred and fifty thousand dollars will be expended for residential flats and apartments near the Bimini Baths, between 1st and 3rd streets. J. J. Warwick and Dr. C. M. Walters have retained John J. Frauenfelder as architect for the structures. The buildings will be 6-story and will occupy the entire frontage of 829 feet. The work has been started.

LOS ANGELES, CAL.—The Eastern Outfitting Company will occupy new quarters at Ninth and Broadway, according to the plans announced by the company. A new building of 6 stories, with provision to add 2 stories later, will be erected at a cost of \$300,000. The Milwaukee Building Company is preparing the plans.

LOS ANGELES, CAL.—The Automobile Club of Southern California has contracted with C. J. Kubach Company for its new office building to be erected at 26th and Figueroa streets. According to the plans of Hunt & Burns, the building will occupy a ground space of 267 by 207 ft., and will cost approximately \$500,000 without furnishings or equipment.

LONG BEACH, CAL.—The city attorney is preparing the resolution for the special bond election to vote bonds to the amount of \$1,925,000. Six propositions are involved. A memorial auditorium to cost \$1,000,000; \$500,000 for parks and playgrounds; \$100,000 for incinerator and sewage disposal; and \$50,000 for comfort stations. No opposition has developed to the bonds.

PHOENIX, ARIZ.—A new union station to be used by the Santa Fe and Arizona Eastern railways jointly will be erected at an expense of \$300,000, according to the plans approved by the Arizona Railway Commission. Plans are by the engineering department of the Santa Fe Railway, under the direction of W. H. Mohr.

LOS ANGELES, CAL.—John J. Frauenfelder, architect, has announced that a \$750,000 housing project of the Bimini Water Co. calls for erection of 58 residence apartment buildings, and is to cover the entire area bounded by Bimini Place and Vermont Ave., extending from 1st to 3rd Sts.

LOS ANGELES, CAL.—The 6-story warehouse, later to be increased to 8-story, for the Westinghouse Electric and Manufacturing Company, will be designed by Noerenberg & Johnson, architects. The building is to be class A construction, equipped with 8 elevators and 5 traveling cranes.

LOS ANGELES, CAL.—The new First M. E. Church has started the work on its new structure by awarding the steel contract to Baker Iron Works for the sum of \$91,326. John C. Austin, architect, states that other contracts will be let at once to prevent delays in building this large edifice.

CALIXICO, CAL.—The Pacific Fruit Express Company will erect a large ice-making and storage plant in this city. The yearly increase in perishable vegetables and fruit from this section has necessitated the shipping in of thousands of cars of ice. The increase of local plants will reduce this expense and improve the service to local growers.

LOS ANGELES, CAL.—Fred Hartstrite will have a class A store and loft build at the corner of Spring and Court streets. Grinnel Sprinkler Company was awarded the contract for sprinkler system and Prewit Electric received the electrical work. The total cost of the general contract was \$52,363. A. S. Niebeker, Jr., is the architect.

HOLBROOK, ARIZ.—The Interstate Commerce Commission has been asked to approve the issuance of notes and stock to finance the building of 73 miles of railroad between Holbrook and Cooley, in Arizona. The application of the Apache Railway Company estimates the cost to be \$455,000.

PHOENIX, ARIZ.—Dr. W. C. Ellis has commissioned the Milwaukee Building Company of Los Angeles to prepare the plans for his 5-story office building to be erected at the corner of Second street and Monroe avenue. Seven stores and 84 suites of offices will be provided. The total cost is estimated at \$300,000.

KINGMAN, ARIZ.—Col. J. C. Greenway announces that the work on the development of power at Diamond Creek, on the Colorado River, will begin in earnest in the fall. The copper interests of this section have joined in developing this 160,000 hp. and the larger part of the power will be used by the mining interests of the state. It is proposed to divert the Colorado River through a tunnel while the dam is being constructed.



An Old Favorite as Rendered by Sadie Wimp OHM SUITE TOME

Mid play sure sand palaces
Wear rare we mare ohm,
Beet averse oh hum bull
Their snow play sly comb.

H Arm from this guys
Seem stew Hal Lois their;
Though use eke threw the world
'Tis snare met with hell swear.

* * *

"The white rhinoceros and mountain antelope are fast becoming distinct," according to the San Francisco Journal of Commerce. Due undoubtedly to the advent of prohibition brew which permits of a better focus on pink rattlesnakes and purple elephants.

* * *

Toonerville Electric News

The new lighting plant in a Colorado town is explained in the local paper as an advance over the former system. The current, it says, "has been changed from 230-v. direct and will operate at 110-v. alternately."

* * *

A Wyoming paper reports:

"Mr. —, superintendent of the local plant of the power company, has been notified that he has been elected a member of the National Electric Light Association. . . . Inasmuch as this election was entirely unsolicited, it comes as a great honor and a recognition of Mr. —'s standing in the electrical world."

* * *

The Tale of a Fisherman as Revealed by the Market Reports

Fish Inactive
General Tone Dull
Rye Lifts Consistently
Bean Situation Barely Steady
Salmon Light on Spot
Metal Undertone Slips
Dressed Meat Down Sharply
Extra Eggs Break at Six
Corn Hits Lowest Level
Fish Rises After General Drop.

* * *

He Looked Forward to Being Back

One of our electrical friends, recently returned from a trip to the Orient, reports that he was such a poor sailor that, although he made the trip by steamer, he nevertheless traveled by rail.

Which reminds, for some unaccountable reason, of the returned soldier who used to be somewhat fast and in conse-

quence a bit slow. He used not to be up to being down on time. But since he has been back from the front, he has been early of late. He was always behind before. But now he is first at last.

* * *

If You Know the Keyboard, You Will Appreciate This

-y atenofracherVs gine tp the cuntry,
Mu srenigrzpher"a gome fat awau.

Mh stenoftsoherVs fone ro hte counret H
As 8 have beeb tryind tp say.

9h brinf nacj, nrinh bqck, on neinf nack ,y "onnie to mr
tp me &

Nring nack. neomh back, oh brinf bac, my nemmie ro me,

* * *

ELECTRICAL HYBRIDS

XX — The Carbon Brushian Dancer



The carbon brushian dancer is a very shocking lady;
She's a pick-up of the most magnetic sort.
Her skin is copper colored and her composition's shady;
She collects from those she touches like a sport.
Though supported by the holder, she will press the com-
mutator

And spark with him—which shows that she is bad.
From positive to negative her feelings alternate her
And the Polish revolutions are her fad.

Journal of Electricity and Western Industry

25 Cents a Copy

February 15, 1922

San Francisco



Look for this Seal

It is rapidly receiving recognition as a helpful guide to the public in seeking reliable electrical appliances and installation materials. It also helps to identify competent contractors. ~ The "check" seal defines a standard which is necessary both to the contractor-dealer and the buying public as a basis of agreement on values.

**PACIFIC STATES
ELECTRIC COMPANY**





TRIANGLE

A COMPLETE LINE

NON-METALLIC FLEXIBLE CONDUIT — **SINGLEWALL**

METALLIC FLEXIBLE CONDUIT

STEEL ARMORED CONDUCTORS



— "TRI-CORD" HARD SERVICE CORD

MANUFACTURED BY

TRIANGLE CONDUIT CO., Inc.

BROOKLYN, N. Y.

THREE COMPLETE STOCKS CARRIED FOR YOUR CONVENIENCE BY

Pacific Coast Distributors

Baker - Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, FEBRUARY 15, 1922

NUMBER 4

Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1921, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Power
Coal Age
Electrical World
Bus Transportation
American Machinist
Ingenieria Internacional
Electrical Merchandising
Electric Railway Journal
Engineering News Record
Engineering and Mining Journal
Chemical and Metallurgical Engineering
Electrical Review and Industrial Engineer

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

141

The Power Company's Obligation in Forwarding Appliance Sales—Have We Reached the Parting of the Ways?—A Danger to the Forest Service—Depreciation Rulings of the Power Commission—The Danger of Farmer Legislation—A Rare Opportunity for Study of Ice Dangers—The Dual Idea in Committee Meetings—The Five Cent Raisin Carton in Eastern Centers—Power Factor Control Has Widespread Interest.

Adequate Highway Lighting as a Developer of Business 149

By CARL K. CHAPIN

Increased night traffic for reasons of pleasure, safety and economy necessitates increased use of lighting facilities.

What Western Power Companies Plan for the Coming Year 151

Statements by executives in major western power companies indicate intention of increasing use of home appliances.

Sales Promotion vs. "Merchandising" of Electric Ranges 153

By BURTON Y. GIBSON

Use of ranges may be increased by the use of ranges by range salesmen and dispelling the fallacy of high cost.

Highest Head Hydroelectric Power Installations of the World 155

By A. T. PARSONS

Although high head plants are characteristic of the West, they are exceeded by European plants.

Successful Use of Electricity for House Heating in Peru 156

By A. S. KALENBORN

Mining company in Peruvian Andes makes successful use of surplus hydroelectric power for camp and house heating.

Commercial Cooking as a Desirable Central Station Load 158

By W. W. WEIR

Increased revenue and diversity of load make this field a desirable one for western power companies.

Before the Advent of Electricity in the West—Frontispiece	140
Western Comment on Current Events	144
Letters to the Editor	146
Radio Bulletins	147
Builders of the West—A. C. Haines	148
Airplane Forest Control Makes Good Western Record for 1921	157
San Francisco Has Completely Electrified Restaurant	159
Self Improvement in Salesmanship	160
Tacoma Will Test Cushman Power Site	161
Increasing Production in Industry	162
Western Dealer, Jobber and Agent	163
Activities of the West	166
Meetings of Interest to Western Men	171
Personals	172
Manufacturer, Dealer and Jobber Activities	174
Business Outlook in Western Market Centers	175
Construction News and Industrial Developments	176
Salvage	178

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY of CALIFORNIA, Rialto Building, San Francisco

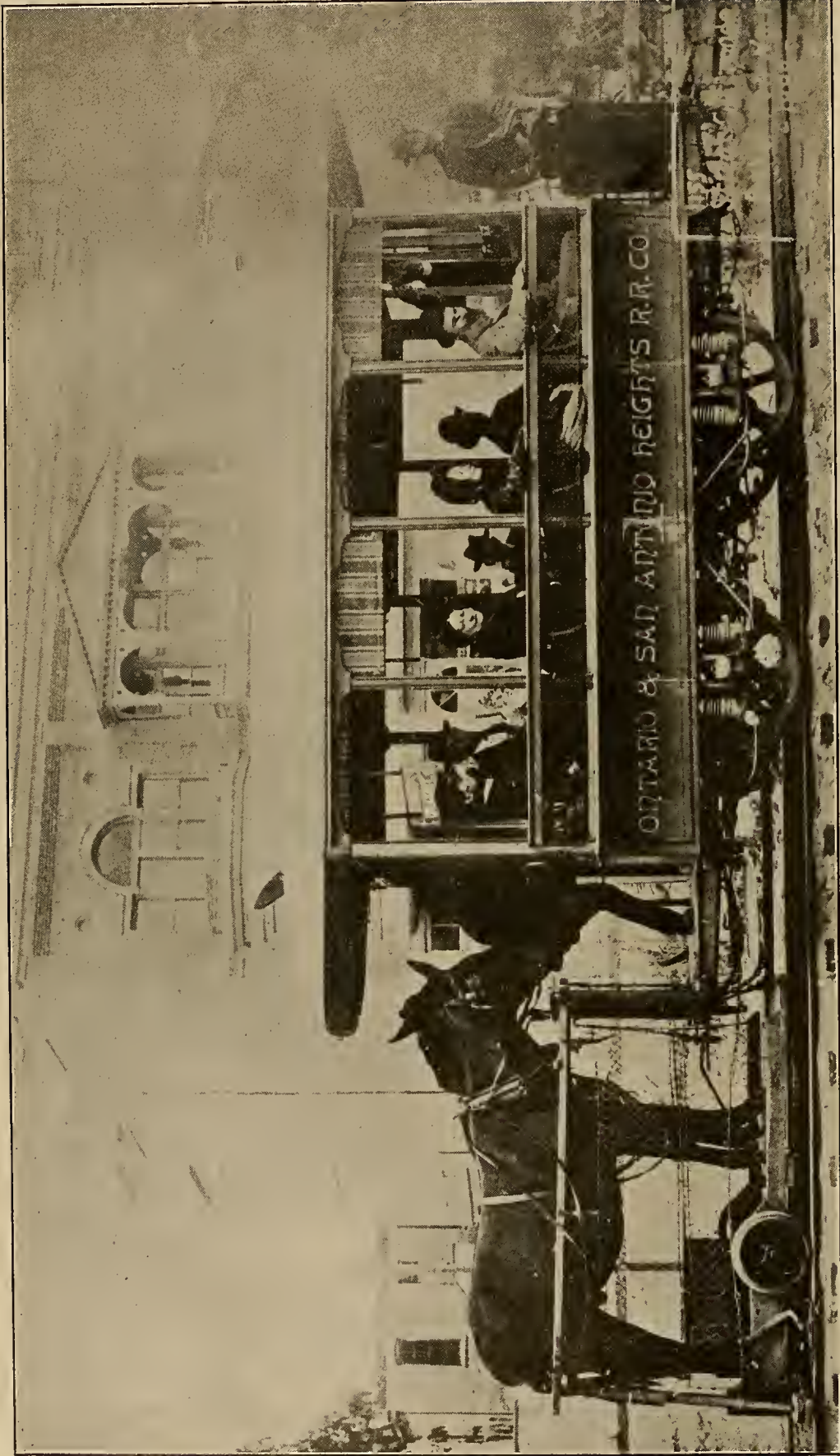
James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



BEFORE THE ADVENT OF ELECTRICITY IN THE WEST

"When like lightning the cars come down, the mules like white folks ride to town," was a rime familiar around 1892 to the school children at Ontario, California, inspired by the fact that after pulling the car shown above up the eight-mile avenue from Ontario to San Antonio Heights the mules were loaded on their private platform for the return trip, which was accomplished by gravity. It is interesting to know that the first long distance transmission line in the world, a 10,000-v. line from San Antonio canyon to San Bernardino, a distance of twenty-two miles, was established near

this spot. The old "mule-car" line was shortly after replaced by a trolley using power from this plant. Not only have these primitive types of transportation been superseded by electrically operated conveyances, but within the past few years a transcontinental railroad, the Chicago, Milwaukee and St. Paul, has replaced a large part of its steam equipment with electric. It is not improbable that the next generation will see in the West a vast interconnected system of power lines from Canada to Mexico, with a completely electrified system of railroads.

Journal of Electricity and Western Industry

A McGraw-Hill Publication
ROBERT SIBLEY, EDITOR

Associate Editors
Norman S. Gallison Clotilde Grunsky George C. Tenney

Vol. 48, No. 4

SAN FRANCISCO, FEBRUARY 15, 1922

Per Copy, 25 Cents

The Power Company's Obligation in Forwarding Appliance Sales

THERE is a great obligation which rests upon the power companies of the West, which they owe not only to themselves and to the industry they represent, but most of all to the public at large—namely, their active support in the furthering of the use of electric appliances in the home. This does not mean necessarily that the power company must engage in the actual selling of these appliances—but it does mean that the power company must give its support, both moral and concrete, to the sales campaigns planned for 1922, through whatever medium the merchandising be done. The power company has a major interest in the placing of these current consuming devices upon its lines—and it has a strategic position in the community for assisting in accomplishing this end, both because of its resources and its public position of respect and because it is already in close and friendly business relations with every possible consumer of the product.

The commercial department of the central station has not fulfilled its responsibility when its leaders attend a banquet or support a fund for the education of the contractor-dealer—the industry cannot afford to

lose the great force of momentum involved in power company leadership in the merchandising field. It is this sense of responsibility in pushing the home appliance field, rather than any intention to enter the lists in the actual sale of merchandise, which is expressed in the interviews with leading executives of the West presented on another page of this issue. It means that western power companies are prepared to advertise, and to assist in servicing electric appliances where this is advisable—it means that power company men will use these appliances in their own homes and tell the story of their value with conviction because they believe it themselves.

This definite stand on the part of central station executives means much to the advancement of the electrical West. It means, if the power companies are in earnest in their active support of all channels of distribution, that the appliance load may easily be doubled during 1922—and that the West, already the leader in the home electrical idea, will emerge from this year with her per capita consumption of electricity in the home far in advance of even its present world record.

Have We Reached the Parting of the Ways?

THE prosperity of the commonwealth is closely identified with the security of private investment. No more serious obligation exists in citizenship than that of preserving the independence of utility regulatory bodies so that their decisions may be swayed solely by facts and in absolutely no sense be dependent upon political considerations.

The past semi-monthly period has witnessed the Governor of California's calling upon the California Railroad Commission virtually to suspend its findings in the case of the Southern California Telephone Company and the Pacific Electric Railway rate raises. Everyone, of course, recognizes the necessity of the utmost care and consideration being given to fair and open dealing in the matter of rate hearings. If the Railroad Commission has failed in this, then open indictments should be issued against them one and all,—but against political subservience this body must now and always take a firm stand if commission regulation is to retain the respect and impartial status it today enjoys in California, and, generally speaking, throughout the nation as a whole.

As to the effect that such a communication may have upon the regulatory body itself, little is known, yet observing men realize that upon this commission are some of the ablest men the West has produced in the present generation and complete confidence is felt among citizens generally that this body will never for a moment suffer itself individually or collectively to bow to political influences, however adroitly used.

It is time for the people of California to realize with what dangerous ease their chief executive is willing to make a political football of an institution whose integrity in the operation of its great powers is the safeguard alike of business enterprise and of the public served. It is time that the public expressed itself in no uncertain terms against that type of politics which under the stress of an election campaign will presume to interfere in quasi-judicial bodies of the state in an attempt to curry popular favor among certain classes of citizens. It has often been said that we get the type of government we deserve. The test of our deserts may well be measured by the degree of approval or indignation with which the governor's move is greeted.

A Danger to the Forest Service

FIFTY-SIX per cent of the total land area of the western states is included in public lands, most of it under the control of the United States Forest Service. The rumored proposal to transfer the Forestry Service from its present connection with the Department of Agriculture to the Department of the Interior is therefore of the greatest interest to this part of the country.

The natural reaction to the suggestion would be at first favorable, as being in line with the advisable consolidation of all engineering functions under one department. On second consideration, however, it becomes apparent that forestry is more nearly allied to agriculture than to any part of engineering. Its function is to promote the growth of products of the soil and its problems are those of pest control and of plant phenomena. Complete and satisfactory co-operation has been established with other bureaus operating under the Department of Agriculture and research work is carried on which would require the building up of a complete new organization were the present connections to be severed.

More important from the public standpoint, however, is the necessity for preserving the present wise policy of timber conservation. It must be remembered that Secretary Fall of the Department of the Interior has expressed himself on numerous occasions upon the subject of conservation in terms which sound strange to those who have the interests of the West at heart. Before a Colorado audience, the Secretary said:

There is enough timber rotting every year to supply the normal demand and yet lumber has reached pinnacle prices. Is this policy true conservation? Timber that is cut and cured and built into houses for the present generation is not lost. It is the truest way to conserve it, for it lasts longer in that form than it does as a standing tree subject to natural decay and destruction by the elements. . . . All natural resources should be made as easy of access as possible to the present generation.

In contrast with the dangers of this extreme, the present Forestry Service stands for the widest use of natural resources consistent at the same time with proper conservation—an ideal which Chief Forester W. B. Greeley well exemplifies. After many years of experiment and through several reorganizations, the Forest Service has succeeded in establishing stable and consistent policies. It is working effectively in cooperation with state authorities and with private interests—and it would seem unwise to break this progressive movement by introducing a new viewpoint.

Depreciation Rulings of the Power Commission

SOME objection has been raised by the Water Power Development Committee of the N. E. L. A. against the final rulings of the Federal Power Commission on depreciation reserves. Under this provision a depreciation reserve must be maintained such that the value of the property is at all times 100 per cent. The objection raised is that in practice,

it is possible to estimate only probable and not actual life of machinery and that good practice among power companies, sanctioned by state laws, show that depreciation reserves need not be much greater than what is required to maintain the project works in efficient operation.

The objection of the committee is that it is not justifiable for a utility to charge against its operating expenses—and therefore against the rates paid by its customers—more than is actually necessary to care for renewals and replacements. The Federal Power Board has exempted from this ruling all companies governed by state regulating bodies, but it is felt that new companies who did not come under this jurisdiction would be particular sufferers and also that the example of the federal board might tend to modify the present rulings of state commissions on this point.

The Federal Power Commission has shown a constructive spirit in accomplishing a difficult problem with inadequate facilities—and it is felt that with full cooperation of power companies in making available the benefits of their practical knowledge of the subject, the present question will be adjusted to the mutual satisfaction of all concerned.

The Danger of Farmer Legislation

VICTORY for the farmers of the country is announced in the passage by the Senate of the recent amendment to the Federal Reserve Act which increases the membership of the controlling board. The original bill provided for the explicit appointment of a farmer to fill this position, and it is reported that the present legislation, although not so pernicious, was passed with the tacit understanding that a farmer will be added to the board.

While it must be recognized that the farmer today through the reaction of economic forces, does indeed occupy a particularly unfavorable position, it is far from clear how the appointment of a farmer on the board will remedy the situation. The Federal Reserve Board has not in the past slighted the farming interests, as the fact that agricultural centers were permitted to draw against the reserves of the rest of the country will show. Nor was the Federal Reserve system created by Congress for the purpose of tampering with the natural laws of supply and demand through dangerous manipulations of discount rates.

The most significant feature of the present effort to secure this legislation, however, is the advent of the farmer in national politics. The group responsible for this measure is said also to have had decisive part in the framing of tax and tariff bills. There is no feeling against the farmer—but it is unfortunate when any legislation is drawn with a bias toward any class. The experience of the past should teach the farmers that their interests cannot be separated from the welfare of the entire country—and that prosperity is not to be secured through special privilege.

A Rare Opportunity for Study of Ice Dangers

TWO rare opportunities have recently been offered for study of effect of snow and ice in transmission line operation. The recent sleet storm in New England which cut out 30,000 customers brought out the interesting deduction that about fifty per cent of the trouble came about due to the signal lines falling down on the power wires. Representatives from the Bureau of Standards and from the National Electric Light Association were hastily summoned and it is believed that some important new laws concerning storm action and protection will be evolved from this study.

Again, on the opposite side of the continent in Washington and Oregon hitherto unexperienced storms are being encountered. Even inoffensive but fascinating Multnomah Falls along the Columbia Highway has unloaded a chunk of ice and snow seventy feet high down on the highway right-of-way below with a resultant demolishing of some thirty miles of transmission line.

Such storms as these, while they do tremendous damage, must be welcomed, however, as opportunities for study in order that future disasters may be scientifically avoided.

The Dual Idea in Committee Meetings

WE commend the dual committee meeting idea that has so successfully been worked out by the present administration of the National Electric Light Association.

In such committees as the Hydro-technical Section with its present enrollment of three hundred and fifty engineers throughout the nation, the time and expense involved in assembling this great number of workers is practically an insuperable obstacle. As a consequence, under the able leadership of Nathaniel A. Carle, the present chairman of the Hydro-technical Section, a system of dual meetings has been worked out whereby simultaneous meetings of the committee are held, one in some eastern center and the other in some far western center, it being understood, of course, that the scheme is not a division of eastern and western activities, but the actual working out of national problems irrespective of sectional bounds. One of the meetings is designated, of course, as the main meeting and the other as the auxiliary.

This new advance is saving both time and expense and is to be commended, provided the subdivisional idea is not extended so far that unified results become impossible of attainment.

The Five Cent Raisin Carton in Eastern Centers

EDITORIAL comment appeared in these columns some issues ago concerning the astonishing record of the Raisin Industry of California in selling in thirty days three hundred and sixty million of these little five-cent packages throughout the United States.

In visiting such centers as Kansas City, Chicago, New York, or even Montreal and Toronto, Canada, the manner in which this confection has gone over the top one hundred per cent in all quarters is quite manifest. Dealers report difficulty in securing sufficient supplies for their needs and the small boys on the streets are eagerly selling them in competition with the venders of five-cent packages of gum.

It is interesting to note that when the West leads, others begin to follow. Eastern dealers report that since the phenomenal five-cent Sun Maid raisin carton has made such an astonishing record, imitations are in existence on all sides with fruits of all kinds put up in little cartons from the Carribean and West Indies. The one thing that western packers must guard against is any deterioration in the cleanliness and quality of these western cartons as turned over to the trade. Eastern mothers have been too often surprised and chagrined by having old and wormy products get into the hands of their children, and they are watching with the keenest interest the advent of the cleanly wholesome Sun Maid and hoping for its permanence. The whole accomplishment is a wonderful attainment for the West and it is believed that the little Sun Maid cartons are today in millions of homes in America silently but effectively telling of the enthusiasm, vision and substantiality of western enterprise.

Power Factor Control Has Widespread Interest

OF increasing interest are the problems of power factor control. How it affects the study of regulation; or whether a question of the capacity of the transmission system—all of these, and many other points of equal importance are part of the program of the Power Factor Committee of the Technical Section in the N. E. L. A., Pacific Coast Division. Under the leadership of F. B. Lewis of the Southern California Edison Company, it is expected that the forthcoming report of this committee will be the most comprehensive yet prepared on this subject.

It is of interest to note that during early December the Southern California Edison Company placed the largest order for synchronous condensers ever sold on the coast. Five units amounting to 55,000 kva. were ordered from the Westinghouse Company for delivery during the summer of 1922. Nearly all of these units will be placed at points near the electrical center of the different load sections, the tendency being, according to the engineers of the company, to get the synchronous sets as near the load as possible. While it is very difficult to prophesy the effect of such distributed capacity on a large system, comprising long-distance transmission and large steam-electric stations located near heavy load centers, it is expected that the general power factor condition will improve at least 10 per cent by the addition of this large group of synchronous condensers. This will be reflected in increased energy capacity of the distribution lines and better operating conditions for the steam generating plants.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing,
Trade Promotion, Legislative and Associated Topics that have a
Special Bearing on Western Business

California Opportunity for Asbestos

Possibilities for New Western Industry to Serve
Local Markets Pointed Out by Mining Man
in San Francisco Address

ASBESTOS offers possibilities of developing into an important industry in California, according to facts brought out by W. J. Woolsey, long associated with the asbestos industry in Canada, in an address before the January meeting of the San Francisco Section of the A. I. M. E.

Although asbestos has been known in California for many years and a small amount has been mined, the total yearly production has never reached more than 230 tons, according to Mr. Woolsey. Putting asbestos production in California on a commercial basis, therefore, would constitute a new industry in the West.

In Canada the first mining of asbestos was started in 1878, and the production steadily increased until in recent years the annual output has amounted to from 150,000 to 200,000 tons or 85% of the world's production.

The following tables show the present world sources and distribution.

WORLD SOURCES OF ASBESTOS, 1920

	Crude and Fiber	Sands
Canada	153,000 tons	41,000 tons
United States	1,500 "	
South Africa	10,000 "	

DISTRIBUTION OF WORLD'S PRODUCTION OF ASBESTOS

	Distribution for year 1920		Pre-war Distribution, year 1913	
	Crude & Fiber	Sands	Crude & Fiber	Sands
Canada	3,000 tons	5,000 tons	2,000 tons	3,000 tons
United Kingdom	19,000 "		30,000 "	2,000 "
United States	120,000 "	36,000 "	65,000 "	12,000 "
Belgium	9,000 "		12,000 "	
France	2,500 "		7,000 "	
Germany	3,500 "		40,000 "	
Italy	2,500 "		2,000 "	
Japan	5,000 "		1,500 "	

In California, as in Canada, asbestos is found in serpentine areas, the known commercial deposits in the Sierra foothills being similar to those of the Thetford Mines district in Quebec. Assuming for the California deposits a grade and quantity of ore equal to the average of the Quebec mines, the California properties have many advantages in working conditions over the Canadian producers. The mild climate of the California foothill district permits work in the asbestos quarries during all the year while in Canada the working season is but seven or eight months. In California the railroad haul is not over 200 miles to the nearest markets against 600 miles in Canada. With a differential freight rate amounting to \$28.00 per ton favoring the California product in the California market, and with at least

equal freight rates to British Columbia and Mexico and with lower rates to the Orient, California produced asbestos should successfully compete with Canadian asbestos in all western markets.

Assuming that mining and milling costs in up-to-date plants in California will be no higher than in similar plants in Quebec, the following table shows the comparative delivery price in California.

COMPARATIVE ASBESTOS PRICES AT DELIVERY POINTS
IN CALIFORNIA

For Asbestos of Eastern Origin			
	F. O. B. Mines	Freight	Delivered
Long Fiber	\$60.00 per ton	\$35.00 per ton	\$95.00 per ton
Short Fiber	15.00 per ton	35.00 per ton	50.00 per ton
For Asbestos of California Origin			
	F. O. B. Mines	Freight	Delivered
Long Fiber	\$60.00 per ton	\$7.00 per ton	\$67.00 per ton
Short Fiber	15.00 per ton	7.00 per ton	22.00 per ton

With several known deposits of large tonnages with average grade and quantity of asbestos per ton in California, near transportation, and with a steadily growing market for all lengths of fibre produced, the outlook certainly looks bright for the rapid development of this industry in California.

Action of Shipping Problems Delayed

Extension of Coastwise Rulings to Philippines
and Establishment of Preferential Rail
and Water Rates Probably Postponed

TWO provisions in the Merchant Marine Act of 1920—that providing for the extension of coastwise shipping regulations to insular trade and that making it possible for the establishment of preferential rail and water rates for shipments for American bottoms, are said to be now open for action, but it is expected in both cases that the matter will go over for later decision.

Western interest particularly centers upon the section making it possible for the President to extend coastwise laws to the Philippine Islands shipping after February, 1922, providing adequate steamship service shall have been established by that time. This would mean the exclusion of all foreign ships now in Philippine service. The U. S. Shipping Board has advised that such service is available—and there is some chance that the requisite action will be taken, putting this provision into effect. Governor Wood, however, is said to oppose the step—and it is predicted that the President will not fully decide the matter until the opposing interests shall have been reconciled.

Another point of special western concern is the

provision which makes it possible for the Interstate Commerce Commission and the Shipping Board to establish through preferential rates on shipments for export, providing the goods are shipped in American bottoms. These rates, however, cannot go into effect until the U. S. Shipping Board will certify that adequate American shipping facilities are available to or from any port in a possession or dependency of the United States or a foreign country. There is a general feeling that the Board is about ready to make this declaration, but in response to numerous objections, it is now unofficially announced that no definite action will be taken until full hearings on the subject have been held.

There is much opposition, as well as keen support of both measures from western sources—and the outcome will be watched closely by all those interested in trans-Pacific shipping.

Plans for 1925 Portland Exposition

Importance of Site and of Electrical Features for Portland Fair Pointed Out by City Club in Survey of Possibilities

OUTLINING the scope and requirements of the 1925 Portland Exposition, should the present plan for such a world's fair be carried out, the Portland City Club has recently issued a progress report. In stating its support of the project, which is now before the people of the state for financial approval, the club points out the necessity of producing something unique in quality rather than in size and fixes upon the two elements of natural surroundings to be determined by the selection of the site and the electrical display possibilities as the two most important factors in producing this result. To this end the club urges a close alliance between architects and engineers and the formation at once of a Technical Board and a Fine Arts Commission who will supervise the making of the plans.

An interesting feature of the recommendations is the plan for permanent improvements which shall later remain for the use of the city as a monument to the exposition. In this connection it is also suggested that the public improvements now contemplated by the city toward general civic betterment be carried through, in order that visitors may receive the best possible impression. The club estimates an attendance of from 4,000,000 to 6,000,000 persons, with a return from this source of \$2,500,000. It is proposed to spend \$6,000,000 on the exposition, to be raised by state and municipal taxation and by donations. Of this it is estimated that \$422,340 should be expended in securing the site, \$805,137 in the preparation of grounds and roads and \$183,449 for mechanical and electrical features.

The money has already been voted by Portland, and the matter of state appropriations will come before the legislature shortly for decision. Many of the more conservative element are expressing some doubt of the advisability of the project in the face of more pressing normal needs—and there is some question of the outcome at the present time.

United States Oil Reserve Estimate

Twenty-year Supply of Oil in Present and Future Development in this Country, Estimate of United States Geologic Survey

NINE billion barrels of oil recoverable by methods now in use still remained in the ground in the United States on January 1, 1922, according to the most complete estimate ever made of the fields of this country. This has recently been announced as the result of a joint survey made by the United States Geologic Survey and the American Association of Petroleum Geologists.

The estimates for known and probable fields are given below by states and areas:

ESTIMATED OIL RESERVES OF THE UNITED STATES, BY STATES OR REGIONS		Millions of Barrels
New York		100
Pennsylvania		260
West Virginia		200
Ohio		190
Indiana and Michigan		70
Illinois		440
Kentucky, Tennessee, northern Alabama, and north-eastern Mississippi		175
Missouri, Iowa, North Dakota, Wisconsin, and Minnesota		40
Kansas		425
Oklahoma		1,340
Northern Louisiana and Arkansas		525
Texas, except Gulf coast		670
Gulf coast, Texas and Louisiana		2,100
Colorado, New Mexico, and Arizona		50
Wyoming		525
Montana, Nebraska, and South Dakota		100
Utah, Nevada, Oregon, Washington, and Idaho		80
California		1,850
Eastern Gulf Coastal Plain and Atlantic Coast States		10
		9,150

The calculations of the oil reserves in "probable" future fields are based on all the available data and represent the best judgment of the geologists, but of course, they are open to possible wide error. Estimates include only the oil recoverable from the ground by present methods and do not take into account possible improved methods of recovery. On the whole, however, the estimates are undoubtedly the best that have ever been made for the United States and the most complete which have ever been prepared for any section of the world.

The estimated reserves are enough to satisfy the present requirements of the United States for only 20 years, if the oil could be taken out of the ground as fast as it is wanted. Should these estimates fall even so much as 2 billion barrels short of the actual recovery, that error of 22 per cent would be equivalent to but 4 years' supply, a relatively short extension of life. However, the committee expressly decries the too frequent assumption that inasmuch as the estimated reserves appear to be sufficient to meet the needs of the country at the present rate of consumption for 20 years, therefore the reserves will be exhausted at the end of that time or, at most, a few years later. This assumption is absolutely misleading, for the oil pools will not all be found within that length of time, drilling will be spread over many years, as the pools are found, and the wells cannot be pumped dry so quickly. Individual wells will yield oil for more than a quarter of a century, and some of the wells will not have been drilled in 1950. In short, the oil cannot all be discovered, much less taken from the earth, in 20 years.

Letters to the Editor

British Columbia Electric Railway Company Seeks Canadian Federal Regulation

To the Editor:

Sir: The outcome of a proposal now being made by the British Columbia Electric Railway Company to be taken under the jurisdiction of the board of railway commissioners, a Canadian federal body, is being looked forward to with interest all over the continent. In practically all cases in Canada, as in the United States, utilities are under provincial or state control.

The circumstances underlying the proposal necessitate a recital of events as far back as 1918 when the company, after a strike of its employees, received permission from the city of Vancouver and the surrounding municipalities with which it has separate franchises, to increase its city fares to 6 cents and its fares to the outer zones to 7 cents. This permission was granted on a "show me" basis, with a limitation of nine months, by which time the provincial government was to appoint a public utilities commission which would investigate the case. The utilities commission was appointed in April, 1919, and started to work.

While some basic points were being settled, word was received from Ottawa, that by some mistake, an act of the Dominion government intended to transfer certain small eastern steam railways to Dominion control had also included the B. C. Electric Railway Company. This deprived the provincial public utilities commission of its principal job, a development that gave the provincial government a chance to abolish the commission the following winter.

In the meantime, action by the city and other local authorities succeeded in having the B. C. Electric thrown out of Dominion control in July, 1920. As this would have had the effect of returning the company to the original franchises—in the absence of a utilities commission—the company sought and obtained an extension of Dominion control to July, 1921.

Foreseeing difficulty over its fares, the company had in 1919 negotiated with the city of Vancouver towards revising its franchise and failing any settlement, the franchise automatically continues for a further period of five years, it being indeterminate with provision for alteration at five-year periods.

Again foreseeing the termination of Dominion control, the company endeavored in February, 1921, to obtain a Dominion charter, which would have had the effect of bringing it under the board of railway commissioners, a regulatory body of high standing. When word of its petition was received in Vancouver, public bodies took immediate action, being jealous of any power of a Dominion body over what they considered a local affair. The company agreed to withdraw its application provided the city would extend its fares another year and undertake to negotiate a new franchise, otherwise the company would reinstate its application.

Negotiations began for a service at cost franchise covering railway, light, power and gas and a franchise was drawn up which, while not very satisfactory to the company, would have at any rate afforded a certain stability. In spite of its favorable nature from the city's point of view, certain agitators took the platform against it on the general ground that it was a franchise and therefore bad on its face, and the franchise died a natural death.

The company has now reinstated its petition and there are murmurs of opposition, in spite of the fact that the board of trade and other public bodies went on record as preferring such a course to the franchise.

Unless some relief is obtained, the fares will have to return to five cents all over Greater Vancouver on July 1, a condition which the company cannot comply with while paying the present wages. Further than this, the company contends that a year to year permission to continue fares is not sufficient—it must have assurance of stable fares for ten or twelve years in order to finance.

There is under contemplation improvements to its Stave Lake hydroelectric plant totaling \$1,000,000. The company has just completed a half million dollar gas plant in Vancouver and a \$300,000 gas plant in Victoria. While this additional capital has been obtained without any further issue of stock or bonds, it is faced in a few years with the necessity of building further power plants costing much larger sums. For this reason, the company states that it must have stability.

JAMES LIGHTBODY.

British Columbia Electric Railway Co., Ltd.

Portland Held to be the Largest Furniture Manufacturing City

To the Editor:

Sir: I have been asked to investigate a letter that was in your November 1st issue, stating that Los Angeles was manufacturing \$19,000,000 worth of furniture per annum against Portland's \$6,000,000. This letter was signed by Mr. Frank Wiggins of the Los Angeles Chamber of Commerce.

We have taken this up with one of the best posted furniture men on the Pacific Coast. He says that it makes him think of the story of the two animals in California, the Oakland "Mole" and the Los Angeles "Bull."

He says that on the face of it, the gross sales as stated, compared with the money invested as stated, is entirely out of all proportion based on last year's business.

Furthermore, this man, representing a Portland factory, went to Los Angeles in September and sold \$230,000 worth of Portland-made furniture in Los Angeles. This is the largest furniture sale of which there is any record in recent years and with the immense output as reported from Los Angeles, it is hardly likely that a Portland concern could secure such a fine contract. Also, comparing the factories one by one, there is great reason to doubt the authenticity of these figures.

They may have included inadvertently some of the retail business of Los Angeles which is undoubtedly very large at this time.

We have no fight with Los Angeles or any other city on the Pacific Coast, being absolutely committed to the policy of advancing the interests of the entire coast as an economic unit.

Portland has a certain definite place in the development of the coast as well as Los Angeles and we are concerned only in setting forth the true facts regarding our locality. The eastern investor is entitled to know the truth. As far as we are able to compute, the total amount of furniture manufactured in Portland and sold to the trade by Portland factories (not retail furniture business) is about \$6,000,000 per annum.

We have reason to believe that we are still the largest furniture manufacturing point on the Pacific Coast.

WILLIAM H. CRAWFORD.

Portland Chamber of Commerce, Department of Industries.

The Value of Good Methods of Installation and the Use of Quality Materials

To the Editor:

Sir: For many years past, through the medium of various bodies, there has been a consistent and successful effort to raise the standard of electrical apparatus and supplies, and through the efforts of electrical journals and newspaper articles much educational work has been done to inform the public of the value of good methods of installation and quality materials.

Those directly concerned with installing apparatus and supplies bought only such materials as would conform to certain standards and which once installed would be a credit to themselves and the user instead of a source of possible trouble and danger.

The war with its frantic urge for speed and scarcity of materials brought about a change, and anything that would do was used. Unconsciously therefore to many their attitude has undergone a reversal of form and the result has been almost an indifference to previous ideals.

For the first six or eight months of 1921 we had what is commonly called a "buyer's market" with dropping prices and very slack building and business conditions, although conditions have become somewhat stabilized since. This coupled with war experience produced an apathy which is deplorable. Many who in the past were loudest in calling for quality and perfection are now indifferent, and price seems to rule.

Too little attention is still being paid to the danger of this attitude of mind, for if allowed to go on the question becomes one of price only and competition on this basis only is considered.

I urge therefore during this present period of stress a greater cooperation on the part of all those engaged in the electrical field, a strengthening of our determination to see only materials bought and work installed as shall be a credit to ourselves and the industry, and to avoid in every possible way a lowering of the standards that have cost so much and taken so long to rear.

H. B. SQUIRES.

H. B. Squires and Company, Portland.

A Possible Misunderstanding of Industrial Figures in February 1st Issue

To the Editor:

Sir: I wish to take this opportunity to congratulate the Journal of Electricity and Western Industry on the list of industrial plants and the analysis of figures which appeared in the February 1st issue. This information should prove invaluable to all those in any way finding their markets in the industrial field of the West.

May I suggest, however, that the table appearing on page 108 is somewhat misleading in that the figure given for total hp. in all industries does not represent the total number of plants in the respective states, but only those reporting in your survey. I gather from the context, for instance, that only plants using 200 hp. and over were included for California and that figures for some of the states include only the thirty or forty large plants which happened to report. It is obvious, of course, that there are other plants using over 100 hp. in these sections, and I hope that you are able to obtain them for future publication. It would be unfortunate to have the value of the figures impaired by a misunderstanding of their exact meaning. Will you not correct the misleading impression in your next issue?

E. C. GRAY.

Oakland, Cal.

Radio Bulletins

Alaska's new steel trail, the railroad on which Congress has expended fifty-two million dollars, will be finished February 15. The road will not be formally dedicated until late in the summer. It is planned to have President Harding drive the golden spike at that time.

Plans have been completed for the building of Garner City, near Bray, Oregon, by the Long-Bell Lumber Company, which has purchased large tracts of timber in this district. Two hundred and fifty houses are to be completed this summer and the city will eventually house 1500 people, have its own light and power plant, theaters and club house. It is to be a model lumber city.

The Southern California Edison Company will spend \$22,500,000 during the coming year to better its service in Southern California. Half of the money will be spent on three hydroelectric plants on Big Creek in Fresno county and the other half on improved transmission and distribution systems.

The Admiralty Logging Company of Seattle has been given an option on the government's partially completed spruce mill and railway on the Olympic peninsula. A total of five million dollars was expended on the project, thirty-five miles of railroad being completed. The company plans to have the mill in operation in three months. It will be electrically operated.

Fifty power companies report that there are approximately thirty thousand electric ranges in use in the West, according to a survey recently made by the Journal of Electricity and Western Industry.

General George W. Goethals, builder of the Panama Canal, is in Spokane, Washington, conducting a survey of the proposed Columbia Basin Irrigation Project.

Following are reports of business conditions in the principal western cities:

San Francisco: Building material and lumber dealers report brisk trade as the result of the increase in building, especially in new homes. The automobile trade is expected to pick up immediately following the coming auto show, which opens next week. Medium priced merchandise is selling. Collections are slow.

Los Angeles: Damage done to crops by the recent cold spell has been overestimated. The benefits from the accompanying rains overshadow the losses. There is plenty of snow on the high mountains, assuring an ample of supply for irrigation and power during the coming dry season. Trade is fairly brisk, with building still occupying the center of attention.

Portland: The most important feature of the week has been the continued improvement in the lumber industry. Production is but sixteen per cent below normal. Sales and shipments are also largely increased. Wheat sales for export to Europe have been reported. The 1921 wool clip is practically sold, a million pounds having recently been purchased by Boston firms.

Seattle: Railroad buying featured the week in the lumber market. Price revision downward continues in all lines, cuts in building materials having stimulated construction held in abeyance for two years. Much improvement is expected in the wholesale and retail trade during the next two months.

Salt Lake City: The financial situation is the best that it has been for two years. Banks report little demand for money. The reopening of the Bingham copper mines seems a certainty and business has been stimulated from continued reports to that effect.

Denver: The reorganization plans as announced by the Denver and Rio Grande Railroad are holding the attention of financial circles here. All Colorado mines have announced a cut in wages of fifty cents a day, effective March first. Trade continues to improve and the general aspect is better than at any time during the past year.

Builders of the West

WE are all familiar with boyhood story books which always dealt with the rise of the humble farmer lad to the presidency of some large concern, and incidentally fame and fortune. We are inclined to treat such books with tolerant disdain as the imaginative creation of the writer, yet now and then we come across some prominent figure in the industrial world whose life has been a veritable Horatio Alger novel. Such a person is Ancil F. Haines, vice-president and general manager of the Pacific Steamship Company, which is better known as the "Admiral Line." We hesitate to accuse Mr. Haines of receiving an early inspiration from one of Alger's stories because a copy of the New Testament, written in shorthand, is said to be the immediate cause of his steady rise "from plowboy to general manager." At any rate, about

thirty-five years ago he was working behind a plow in North Lewisburg, Ohio, and suddenly decided to run away from home and become a railroad president. The route he chose was to work as a stenographer in a railroad office and keep his eyes open for a chance to occupy the president's chair. He spent a few years alternating between high school and farm work, meanwhile perfecting his stenographic ability by assiduous study of the copy of the New Testament, published by an enterprising correspondence school. His first job was with the Cincinnati, New Orleans, Texas Pacific Railroad at forty dollars per month. From this he stepped to the position of stenographer to the general passenger agent of the Chesapeake and Ohio Railway, in which position he traveled extensively over the company's lines. He later accepted a position with the Baltimore and Ohio but determined that the East and Middle West did not offer sufficient opportunities, and attracted by an excursion poster telling of the beauties and resources of the Pacific Northwest emigrated to Tacoma in 1891, when he was twenty years old, to become assistant to the general agent of the Northern Pacific. The Northern Pacific had just taken over the Puget Sound and Alaska Steam-



ANCIL F. HAINES

Vice-president and general manager of the Pacific Steamship Company, who is a leader in maritime affairs on the Pacific Coast, and a firm believer in America's destiny as the leader in world trade and in the future of the Pacific Coast.

ship Company and he was assigned to the water department. After a number of years he definitely gave up his ambition to be a railroad executive in favor of the more fascinating ship-ping game, and sensing the great opportunities in this field he decided to branch out as an operator. With this in view he organized the Borderline Transportation Co., starting with one old steam schooner running from Puget Sound to British Columbia. The Borderline Co. was capitalized at \$75,000; later this was increased to \$100,000, then doubled when five vessels were plying Puget Sound waters.

In 1916, the Pacific Alaska Navigation Co. offered Mr. Haines the management of its fleet and when this firm merged with the Pacific Coast Steamship Company he was selected by the president to be manager. Later he was made

vice-president and placed in full charge of operation and traffic. From his aerie in the 42-story Smith Building in Seattle Mr. Haines directs the operation of more trans-Pacific vessels than are operated by any other American company. Today the Admiral line pennant flies over 38 ships operated on nine separate routes on the Pacific. The ships are distributed between the Puget Sound-Trans-Pacific, Alaskan, Coastwise, European and Pacific-Atlantic routes. The company employs ashore and afloat 8,500 persons and maintains 120 individual agencies in different parts of the world. Mr. Haines is active in civic and commercial affairs in Seattle, being president of the China Club, an organization composed of steamship and business men devoted to the cementing of friendly relations between the United States and China. He has taken an active part in advocating legislation to promote the development of an American merchant marine, and believes in our future as the leader in world trade.

To Ancil F. Haines, then, for his contribution to the growth of the empire west of the Rockies and his unswerving belief in the future of Pacific trade, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Adequate Highway Lighting as a Developer of Business

The Increasing Proportion of Traffic Carried Over Highways at Night
for Reasons of Safety, Pleasure and Economy Necessitates
Increased Use of Lighting Facilities

By CARL K. CHAPIN

TWO or three years ago if one desired to travel an appreciable distance across country, it was thought to be more pleasant to make the trip at night. Behind a strong pair of headlights, with few others on the road, it had many advantages. Today this is all changed. It is estimated that thirty-five per cent of all automobile traffic on the highways of California occurs between the hours of 6 p.m. and 6 a.m. Automobiles are not the only heavy users of the roads during the night, since twenty-one per cent of the truck traffic is handled during the same period. This increase in traffic caused in a large measure by the growth of commercial truck lines, suburban motorists, passenger buses and the rapid increase in the numbers of automobiles, has not only robbed night driving of many of its pleasures but has made it dangerous in many cases.

The development of the paved state and county highways in California, which cover practically the whole state, has transformed what were formerly dusty country lanes into thoroughfares carrying thousands of motorists each day. There are approximately seven hundred thousand registered motor vehicles in this state and at present rate of increase should reach the million mark in 1926.

Rural communities, suburban homes, farms and general business have developed with the increase in vehicles and the extension of highways.

20,000 Vehicles the Limit for Single Roadway

The automobile clubs of California recently gathered data on the traffic densities in many different parts of the state. On the lower peninsula near San Francisco, they found 19,591 vehicles passing one spot on a single highway between the hours of 6 a.m. and 8 p.m. of the same day. (Many highway engineers in the United States consider 20,000 vehicles as representing the limit of traffic on a single roadway.) In this California survey they also found numerous instances where the average daily traffic exceeded 4,000 vehicles per day. This seems to be far below the supposed limit of 20,000. However, the highway carrying the 4,000 was only one-half the width of that which handled 20,000.

It is definitely established by many highway engineering records, in various counties within the state, that the growth in traffic is taking place at the rate of 300 per cent in 7 years. The farm-to-town movement of vehicles indicates that the average good highway, near large population centers, must carry 2,000,000 tons of traffic in a year. One-fourth of this represents trucking.

Many kinds of fruit are hauled at night to the packing houses or shipping points, to avoid the

higher temperatures of the daytime and the consequent damage to the fruit. Contracts with haulage companies frequently specify that all the transport of the fruit or perishable vegetables must be done at night. A truck and trailer carries the equivalent of a full carload, and trips are so timed that the journey will end at the warehouse or siding before the direct heat of the sun has had an opportunity to injure the contents. The back-country may thus keep in close contact with the markets, without the product suffering due to the handicap of distance.



Low candlepower units on every other pole are used in connection with a recent development of concentric reflectors. Experiments in the East have been conducted for some time with this fixture. The same tests are now being made near Los Angeles.

The highways carry constant streams of farm-to-market products; and as stated before, 21 per cent of the truck traffic occurs during the dark hours.

Night Hauling by Contract Increasing

An increasing number of city dealers in building materials and machinery supplies, are handling their own merchandising to the rural buyer or distributing agency. If the loaded trip is made in the daytime, to reach the customer during business hours, the return trip is apt to run well into the night.

The average law-abiding automobile driver disapproves of the blinding headlights of passing cars. He does not use them himself. It is therefore logical for him to choose to drive on the highways that have some uniform system of lighting; it relieves the eye strain, and the necessity of constant watchfulness, because objects can be readily observed ahead, many

times the distance that is required for stopping the machine.

It is customary to think of trucks, or truck trains as traveling at low rates of speed. As a matter of observation it is found that the speed of most freight carrying vehicles is between 16 and 20 miles per hour. Due to the load carried, they should have the same stopping distance for safety, that is required for a 3,000-lb. automobile traveling at 30



Practically all of the illumination is confined to the roadways and not lost on the surrounding country. This type of unit is suitable for the highways with the heaviest traffic and where pedestrians need the light. The traffic carrying capacity of narrow roadways may be safely increased if properly lighted. Glare and reflections which interfere with the vision have been successfully eliminated and the blinding headlight has no further excuse for its existence.

miles per hour. Trucks generally are equipped with less effective headlights than pleasure cars, and the lighted highway is of inestimable value to the truck driver. It makes possible that degree of carefulness in driving which avoids obstructions or holes, where the impact from a truck might materially damage the structure of the pavement. It prevents the driver from running off the traffic roadbed onto the shoulders by the side of the road. These shoulders cannot stand the impact nor the dead weight of the load limit allowed on the highways.

Construction and Maintenance Costs

There are many instances where the volume of night traffic requires a normal application of street lighting equipment as found under city conditions. If so, a minimum of .4 foot-candles between lamps can be obtained at a yearly operating expense of \$700 to \$800 per year. The general conditions of country highways where it is desirable to provide for the increased traffic of the future and attract traffic as a forerunner of business, do not warrant the expenditure of large sums for ornamental post construction. By the same reasoning it is not necessary to install units with more than one-half the maintenance costs, if these units are properly spaced and at suitable heights above the pavements.

One County's Experience

An examination of the present status of highway lighting in one county found more than 5,000 lights, distributed over 186 miles of roadway. The

lights had been installed at different times under varying conditions and are an outstanding example of why the study and knowledge of engineers is vitally necessary in working out more suitable standards of installation methods and equipment not in general use at the present time. The electrical industry is held responsible for monstrosities now installed by promoters of urban property. These county authorities are confronted with higher maintenance expense than any reasonable installation should require. Some of the installations referred to cannot even be used because of total unfitness. There should be no excuse for an electrical installation of multiple lighting units with a 40 per cent drop to the last lamps on the branches of the circuits. There seems no valid reason for dotting the roadside with hundreds of uneconomical units which these county authorities cannot find the money to operate, yet both exist in this county.

Boulevard lighting should not be confused with highway lighting; although the latter may ultimately grow into the conditions which justify the more expensive and beautiful installation. In the absence of local distribution calling for a pole line, alternate poles may be set—assuming a pole spacing of 150 to 175 ft.—and the line completed by adding the balance of the poles when the demand for local lighting and power service develops. Under such conditions 100-c.p. lamps spaced 300 to 350 ft. apart, suspended on brackets from the poles at an elevation of 16 to 20 ft., can be constructed at a total cost of \$1,200 to \$1,500 per mile. A more uniform distribution with the lower intensities is just as effective in producing the "silhouette" by which most objects are discerned at night, without any of the glare which may occur from the higher candlepower lighting units.

Development Follows the Paths of Lighting

Records show that where the installation of highway lighting is once started, the calls for its extension quickly follow and the highways become dotted on either side with residences.

People do not wilfully choose to live by the dark and lonely roadside. Traffic is similarly attracted to lighted thoroughfares. With western population and business development making rapid growth from year to year, it is not sufficient to add 10 per cent each year to the existing highway lighting installations. Traffic of the next few years, must and will find a doubly increasing proportion of its volume carried during the dark hours. Every sane reason as to safety, pleasure, and economic distribution, argues for a greatly increased use of electricity in providing uniformly lighted arteries of traffic.

We cannot think of discontinuing the street lighting in our cities without a shudder. Even on wide streets the result would be disastrous. With county highways ranging from one-third to one-half the width of city streets and traffic growing to like volumes, it would seem that a more rapid extension of highway lighting must be developed to meet these conditions.

What Western Power Companies Plan for the Coming Year

Concrete Plans of Power Companies in All Parts of the West Show a Tendency Toward Active Campaigns to Extend the Use of Home Appliances, Especially for Electric Cooking and Heating

W. R. Putnam

Vice-President and General Manager,
Idaho Power Company

"In the western territory, the opportunity for sales of electricity are generally in the following classes: 1—Residential Service, including Lighting, Appliances, Cooking, Water and Air Heating. 2—Commercial Lighting Service. 3—Street Lighting Service. 4—Commercial Power. 2—Electric Railroads.

"From the information which I have received, I think I can correctly state that no companies have had an appreciable loss during 1921 in any of the above classes of service, excepting commercial power, and, possibly, commercial lighting, with the exception that, in those cases of supply to electric railroads, where the electric railroads have materially reduced their operations, our service has correspondingly suffered. On the other hand, many of the electric utilities during the past year experienced a very considerable growth in the other lines of service.

"The problems which confront the central station executive under these conditions might be summarized as follows:

"1st—No matter what the conditions are existing in the territory served by the company, the time is now ready for enlarged sales activities.

"2nd—The buying power of the average customer during the coming year will be as great, or greater, than last year, and, in many instances, due to a greater reduction in costs of living than in income, will be greater than during the years 1919 or 1920.

"3rd—The general spirit of optimism for the future which is gaining ground among all classes of business is going to be helpful in developing greater sales of electricity to commercial users, but, on the other hand, in many lines of commercial power sales, increases will depend not so much upon what the central station attempts to do as upon improvement in business conditions applying to the industry requiring electric service."

John A. Britton

Vice-President and General Manager, Pacific Gas and Electric Company

"I believe, notwithstanding the pessimistic statements which are being made in some papers respecting northern California, that it is just awakening, and that the demand for electric energy in 1922 and thereafter is going to far exceed the most sanguine expectations of the most optimistic; especially will this occur, in my judgment, in the sale of electric ranges and household appliances.

"The electrical industry to encourage industrial development in this day will have to work generally with other organizations that are seeking to bring industries here. Our rates are low enough, our service exact enough, and our ability great enough to take care of

any developments that may be made industrially.

"There never has been a time in my memory when the future was more assured from our standpoint. The day of power shortage has passed and what we have all been looking forward to for years has at last been accomplished, namely, that of having surplus to take care of possible peak load demands, as occurred during the war. With our great climate, with the thousands of acres yet uncultivated, and with the demand for our products existing everywhere, coupled with the fact that the labor situation is in better condition than ever it was, we may look for industrial growth. There is no reason why the raw silks from the Orient, and the tin from Java, should both be carted across the continent and returned to us for our consumption. The manufacture of silk can just as well be conducted on the Pacific Coast as anywhere, and better in my judgment, and our canning industry presents a sufficient nucleus for the utilization of tin to make the tinning of plates unnecessary, so far as we are concerned, in the East. Also the development of our mineral resources presents great possibilities.

"To sum up, I therefore look for an extremely prosperous year—this year of 1922."

A. B. Day

General Superintendent, Los Angeles Gas and Electric Company

"The business outlook along electrical lines in this territory for 1922 is very bright indeed, and in anticipating the growth expected we are this year installing a 17,500-kw. generating unit at our local central station.

"Our business during 1921 showed a consistent increase of between 30 and 35 per cent throughout the year over the previous period, and I cannot at the present time see any reason why this record will not be duplicated during 1922."

S. M. Kennedy

Vice-President, Southern California Edison Company

"It is expected that line extensions will be made upon a liberal basis during 1922. Throughout the entire area of Southern California there has been and is and continues to be a heavy demand for houses and new construction is being carried on in this direction on a large scale. The company is taking care of all reasonable applications for service, including extensions of distribution lines when necessary. These remarks apply to urban, suburban and interurban businesses.

"As business conditions become more normal, there is every indication of a steady increase in the demand for power service. Many new industries are being started in California and many eastern manufacturers are considering the installation of branches on the Pacific

Coast. This means that the manufacturing and industrial load will be considerably added to during the coming year. In the agricultural line many more acres are being brought under cultivation and where electric energy is available, electric power is used for operating pumping plants for irrigation. Development and operation of oil properties is also creating an increased demand for power and we believe in 1922 this demand will be still greater enlarged."

D. L. Huntington

President, Washington Water Power Company

"It is difficult to analyze the business outlook in our district for 1922. The agricultural districts which we serve are in rather bad shape financially, as in many instances the wheat farmers did not receive enough for their grain to pay the debts that they had incurred in producing it. This has had the effect of curtailing expenditures for current and for appliances. In a few of the less prosperous districts sales of current and appliances are running slightly behind those of a year ago, with every prospect that they are likely to continue so for the present. In the more prosperous districts slight increases are shown in sales of current, but decreases in sales of appliances, and we anticipate that a somewhat similar condition will continue there during 1922.

"The lumber industry, however, is beginning to look up, and that will help the situation. Mining is also slightly revived, metal prices are slightly better, and we anticipate a gradual revival for that line of activity.

"In a general way, we believe that our earnings in 1922 ought to show moderate increases, although we have no large projects in view.

"We look for some reduction in taxes, except Federal, where the 12½ per cent change will tend rather to increase than to decrease the burden, but there is great activity in connection with various tax-payers' associations and leagues, which indicate a determination to compel public authorities to curtail public expenditures. In fact, we had some benefit from that effort in 1921, our taxes, other than Federal, actually showing a decrease in 1921 as compared with 1920."

A. B. West

Vice-President and General Manager, Southern Sierras Power Company

"The hydroelectric industry, like transportation, is a basic industry, whose future is unseverably tied up with that of the territory and people it serves. The two can only develop along parallel lines and any factor tending to advance or retard the one will have a like effect on the other. In this industry, engineering and legal considerations require that new water power developments be planned from

five to ten years in advance of current development. This means that new plants, serving any given territory, must be planned and designed to supply the demand that will, under normal conditions of growth, be made by such territory five or ten years in the future.

"Hence, forecasting the future is an essential part of our business, and, since that future manifestly depends on the progress and prosperity, first, of the regions we serve, and second, on the progress and prosperity of the country as a whole with its inevitable regional reaction, any plans we make must reflect our sincere verdict upon the present outlook.

"Taken as a whole, the industry in California has put itself squarely on record during the past year as backing prosperity against depression to the limit. Not only have ten millions of dollars been invested in new plants and developments, but a construction program has been adopted which will at least double the present investment during the next eight to ten years, and present investment is well over half a billion. This great building program rests primarily on faith that the growth and prosperity of California will continue evenly and steadily as in the past."

T. O. Kennedy

Formerly Chairman, Electrical Cooperative League, Denver

"Our Electrical Home will be opened March first, and we are already engaged in an active campaign of interest-creating publicity in connection with the Electrical Home.

"We are also encouraging individual advertising on the part of all members of the electrical industry, bunching the dates for such advertising so as to maintain an electrical page once each week in every newspaper in the city.

"We are encouraging the contractor-dealers to actively solicit wiring jobs in existing unwired residences, and particularly to push the installation of convenience outlets in houses that are inadequately wired.

"The central station is actively pushing the sale of modern fixtures, replacing obsolete lighting installations in both the residential and business territories.

"In view of the shortage of retail business sites in the established shopping districts, and the resulting rent increases in these congested districts, we are concentrating on a campaign to impress merchants with the fact that a portion of the rent saved by locating outside of the congested district, if spent in attractive decoration and illumination, will put them in position to attract an equal amount of trade, as if located at a more favorable site.

"We are establishing the fact that electrical appliances in the home are a necessary economy rather than a luxurious novelty, and in this connection it is interesting to note that the Colorado National Bank recently issued a booklet relating the experiences of a number of Denver families who kept their expenses for the year 1921 on a budget system of accounting recommended by the bank. Six of these families made reference to the saving effected through the use of electrical equipment in the home, mentioning specifically toasters,

small heating appliances, electric sweepers, washing machines, and electric ironers."

A. G. Wishon

Vice-President and Managing Director, San Joaquin Light and Power Corporation

"From a study of the conditions as we see them, we anticipate that our increase in connected load should be normal—based on past increase. During the years 1920 and 1921 we, of course, experienced the greatest rush of new applications in our history, which necessitated a tremendous increase in our operating organization and involved the problem of training new employees in a brief period of time. However, we are at present well organized and have sufficient plant capacity to more than take care of the demand that we expect to be made upon us during the coming year.

"In addition to connecting new services, this year we will give special attention to building up the load to the consumers already served, by encouraging the use of current-consuming devices.

"Due to the growth of the company we are contemplating the construction of a modern office building and new industrial yards this season; and in addition to adding the usual mileage to our system, we will also carry on quite a program of construction—made necessary in correcting load conditions, building in tie lines, etc., that we were forced to delay during the rush of construction just past.

"We are arranging to carry on an intensive consumer ownership campaign for the sale of our prior preferred stock to provide the necessary junior funds for the big Kings River construction program with which you are familiar.

"Our principal effort this year will be one of education—educating the consumer as to what the power company means to his individual prosperity, that we may receive his support in legislation that will continue to make possible the financing necessary for the development contemplated.

"There can be no question of the power companies having sold the idea of the use of electricity and of the value of electric service to the state at large."

Guy W. Talbot

President, Pacific Power and Light Company

"Our territory is very much behind in its building program, especially as to residences. We are short of homes throughout the entire Pacific Northwest and particularly throughout the territory which we serve. Already we see substantial evidence of new home construction in 1922 and we expect to capitalize this to the biggest possible extent.

"While there will be considerable added industrial activity, there will not be any great demand for large blocks of power, but there should be a demand for moderately sized motors.

"It is our opinion that there will be a considerable increase in irrigation business on a small scale, but no large projects. For instance, in our territory the state of Washington has designated sixty modern farms to be developed by irrigation in the White Bluffs district of Benton county, for ex-soldiers, and

this should be the nucleus of quite an activity in this district by others.

"We plan to make all new residences as near 100% electrical as possible and we expect to carry on a number of extensive appliance campaigns. Our first big effort will be a cleaner campaign in March. We expect also to enter into a much more active campaign for the sale of electric ranges than we have heretofore.

"Our officers feel that the year 1922 will provide a good substantial increase in business, if we go out after it, and this we propose to do."

Franklin T. Griffith

President, Portland Railway Light and Power Company

"The outlook for the electrical industry in Portland and vicinity for the year 1922 is encouraging. The use of electrical energy is steadily increasing. The most marked increase in consumption during the last year and in immediate prospect, has been and will be in further development of the use of energy in the homes of the people.

"There has been a considerable increase in connected load in this territory during the past year, but by reason of the slowing up of general business conditions the consumption of energy for industrial purposes has not been as great as might be expected from the increase in connected load. There was, nevertheless, an increase in generation by this company of 6% in 1921 over the year 1920 and we confidently expect, with the general revival of business, to materially increase our generation in 1922 over that in 1921.

"Our confidence in the future of the electrical industry is perhaps best shown by the fact that during the year 1921 we increased our generating capacity nearly 20,000 hp., and we have now commenced the construction of a new hydroelectric plant which, when completed, will have an ultimate development of 80,000 hp. We expect to diligently prosecute the construction of this new plant and to have the first unit of 30,000 hp. in operation by the summer of 1924."

H. F. Jackson

General Manager, Great Western Power Company

"I have carefully reviewed my own thoughts as to prospective sales of electric power during the coming year and feel that there should be a revival of business in the spring which will reflect a considerable increase in energy sales at the end of the year.

"Most of the utilities have, for the past few years, taken as a matter of routine, the pushing of their sales all along the line and consequently there is very little of novelty in the programs under consideration.

"I believe that the outstanding activity this year will be a more comprehensive campaign for the electrification of the home, especially in electric cooking and heating.

"It does seem to us that the conditions in this part of California are ideal for the home electrical in all of its phases and the realization of this fact is now being demonstrated in the active planning for a large sale of electric ranges during the coming summer."

Sales Promotion vs. "Merchandising" of Electric Ranges

An Increase in the Popularity of Electric Ranges May Be Effected by the Use of Ranges by the Range Salesman and by Dispelling the Popular Fallacy of High Initial Cost

By BURTON Y. GIBSON
Pacific Coast Representative,
Walker and Pratt Manufacturing Company

SINCE the electric range has been the subject of more discussion than any other individual electrical appliance it would seem futile to add more than has been said. Every imaginable mechanical feature has been expounded, the story of its economy and convenience has been told at length. The central stations of the West are convinced that it is a desirable addition to their load, both from the idea of revenue and the diversity of the load, and the other branches of the industry are naturally in favor of its increased use. Yet the present number of electric ranges on western power company lines does not show an adequate return for the immense amount of publicity devoted to increasing its popularity.

That increased interest is being shown in the electric range load is evidenced by the 1922 plans of the central stations throughout the West and it is this fact that prompts an attempt at pointing out what an analysis will show to be the weak links in getting the range load. In the past the problem of placing the electric range in the public's kitchen has been approached from a "merchandising" standpoint. When one surveys the results of this procedure he cannot but wonder if it has not been attacked from the wrong angle. The contention is here advanced that the theory of "merchandising" electric ranges is fundamentally wrong, and that they should properly be handled through "sales promotion." There is a vast difference between merchandising and sales promotion. Merchandising consists in selling what the public asks for, in a courteous and efficient manner, while sales promotion is introducing or creating a desire of purchasing something having intrinsic merit. Naturally, after the desire has been created the range may be "merchandised," but that desire has not been universally created; the essential groundwork sales promotion has not been laid.

That the electric range has reached its present popularity would seem the result of luck rather than design, when the haphazard methods of "merchandising" are considered. It has developed in a few years to a large industry in the face of much criticism and abuse. Thus it would seem that it possesses intrinsic merit. What, then, are the obstacles that must be overcome before it can become universally popular? How can this desire of ownership be created?

One obstacle is question of cost, in its initial purchase as well as installation and operation, another is the fact that the members of the electrical industry are not themselves sufficiently sold on the electric range to impart that necessary feeling

of enthusiasm and confidence which is essential to the success of any undertaking. They are woefully delinquent in this regard. This unconscious skepticism or lack of sincerity is responsible for a large part of the apathy of the public as well as loss of actual sales.

The average householder on the Pacific Coast will admit that the electric range is clean, efficient, convenient and simple to operate. When a customer calls at a dealer's store or at a power company's office and asks about an electric range it is my contention that he is 45 per cent sold. Is there anyone connected with the sale of electric ranges who is willing to admit that he lacks information as to practicability and cost data, and the necessary enthusiasm to effect the sale?

"Own Your Own Range"

It is axiomatic, and a first principle of salesmanship that in order to effect a satisfactory sale the salesman should be thoroughly informed about what he is selling and should believe what he says. The only way that an electric range can be properly sold is for the salesman to be so familiar with it that he fairly radiates confidence. This kind of knowledge and enthusiasm can only be gained from actual contact and operation. Then he can speak of the merit, economy, cleanliness and convenience with assurance. It should be a primary qualification that everyone in any way connected with the sale of electric ranges should have an electric range in his own home.

Now as to costs! I contend that everyone who uses electric lights is a prospect for an electric range from the dealer's standpoint, and that anyone who is within reasonable serving distance is a prospect for the central station. A householder who uses electric lights cannot afford to be without an electric range. The proportionate difference in cost between electric lighting and other lighting systems is far greater than between electric cooking and other cooking systems! It is only a matter of convincing the customer that he is getting value received in comfort, convenience, and cleanliness which will more than compensate for the initial outlay.

This bugaboo of initial cost is not as serious as most salesmen seem to regard it. All that we can do is to accept the manufacturer's word that the range is worth what he charges for it, and granting an efficient organization, it should be worth what it costs to produce, plus a reasonable profit. If I hear of a sale which was lost due to price alone, I immediately assume that it has not been properly negotiated.

Regarding costs of operation, the actual costs are often below that of other cooking systems. The

average monthly consumption of an electric range is in the neighborhood of 100 kw-hr. With a rate of three cents per kilowatt-hour this would not seem excessive.

Costs of Operation

In the following table an attempt is made to show that there are actual economies which may be effected with the use of an electric range, which will more than pay for its cost of operation.

	Per Day	Per Month
Cool kitchen	\$.01	\$.30
Cleanliness, comfort and health.....	.01	.30
Saving in labor, 1 hr. per day.....Per hr.	.10	3.00
(Which is a very low estimate), due to it not being necessary to watch, twist and turn, food in the oven. Proper adjustment on the surface burners obviates attention until cooking is completed.		
Saving in food values.....		1.20
One roast per week, 5 lb. @ .30 per lb. Other food values have not been taken into consideration intentionally, such as under-baked and burned dough products, the under-cooked and burned foods cooked on the surface burners. This waste is considerable.		
Life of the range.....		
Fire hazard reduced .....	.01	.30
Due to lack of matches, no flame, no fumes, no gases or explosions.		
Saving in utensils		
Due to lack of flame, the pots and pans will not warp and cause a concave or convex bottom.		
Soap and dish towels.....		
Due to lack of flame, the pots never become black or smutty on the bottom.		
An absolute saving		\$5.10

By increasing the values in the above tabulation the remainder can be applied to the cost of the range, or to the difference in cost between the price of an electric range and any other cooking device. This should show the fallacy of the price nightmare! Add to the above figures the pleasure of using an electric range, and the satisfaction of perfect results, and you have the following formula:

$$\frac{\text{Quality}}{\text{Price}} \text{ plus } \frac{\text{Satisfaction}}{\text{Low Cost}} \text{ minus Nothing Equals } \begin{matrix} \text{ELECTRIC} \\ \text{COOKING} \end{matrix}$$

Aside from the two obstacles mentioned above, there are matters of distribution that should be discussed.

Contractor-dealer selling should be encouraged in every possible way. Central stations should sell electric ranges, but only at prices that contractor-dealers can compete with. The installing should only be done by a dealer or contractor. With this system, when the central station is ready to turn the electric range business over to the contractor-dealer he will have the groundwork of sales promotion laid.

Contractor-Dealer Selling

In order to encourage the contractor-dealer in selling, some system in the nature of compensation should be put into effect. It costs the central station a certain amount to sell a range, and if a dealer has sold a range he has relieved the central station of this selling expense. For instance, if it costs the central station \$5.00 to sell a range the central station should be willing to pay the dealer 50% of their sales expense or \$2.50. The difference between these two amounts is to compensate the central station for the publicity and pioneering work done by them.

In this manner it will encourage the contractor-dealer to assist the central station to the advantage of both parties, ultimately relieving the central station of the selling entirely. The repairs and servicing should be assumed by the central station, for obvious reasons.

During the sale of an electric range, the other stove or cooking chamber always presents a problem, and it is my firm belief that some system should be worked out to take care of this matter. Something of this nature: Suppose the price of the range is \$200.00 (not installed) and the prospect has a coal or gas range in the home. If the old equipment is left to remain in the home, he naturally buys a smaller stove and the revenue is in proportion, with practically the same serving expense. Therefore, it behooves the central station to make an allowance on this old equipment to get it out of the way, thereby increasing the revenue, selling a larger stove and making the consumer an all-the-year-around customer. This makes the purchaser of an electric water heater a certainty, and insures the complete electrical home, since the interior wiring is now done. With the proper pricing of the ranges, so that the contractor-dealer can participate, it will not be difficult to make a 5% allowance on the old equipment when the selling price is less than \$100.00 and a 10% allowance when the selling price is over one hundred dollars. I feel sure that in the aggregate this class of junk can be disposed of without any loss.

The manufacturers of electric ranges claim that the range has passed the experimental stage, and this we heartily agree to, but the manufacturer does not seem to have a conscience when it comes to changing the design or models, thereby leaving the central stations high and dry with antiquated ranges on their systems. It seems to be a race between the electric range manufacturer and the automobile industry as to which can make the most changes and still "get by."

The servicing expense is grossly under-estimated, due mostly, to the change in the models and designs, thereby making uniformity or standardization most impossible. A range should be serviced entirely from the front and it should never be necessary to disconnect the range in order to make replacements of any kind. Oven linings are an item that has been often overlooked. Broiling is one of the most essential requirements, yet the wattage is often not sufficient to do an effective job. The service man is not a contortionist and the manufacturer should see that standardization and accessibility are paramount in their product.

The central station has certainly done a large part in promoting and pioneering the electric range and the electrical jobber should function in accord with the central station in carrying the stock, warehousing, carrying ample repairs, seeing that the proper publicity and sales helps are always available, and assist in the outlining of a campaign, for the range business is too large and valuable to the electrical industry as a whole for the central station to carry the entire burden.

Highest Head Hydroelectric Power Installations of the World

Although the Development of Hydroelectric Energy in the Western States is Characterized by the Utilization of High Heads, these Installations are Exceeded by European Plants

By A. T. PARSONS
Pelton Water Wheel Company

IN the design and construction of hydroelectric plants for very high heads, a great many limiting factors enter. Even where a high head is available, there may be a number of reasons for the division of the project into two or more developments. The supporting ground for the conduit may be unsatisfactory, or the thickness of pipe lines required for the maximum head may be so great that important savings may be made in cost of penstock. Again, within the power house, the cost of providing for the tremendous pressure and stresses in the machinery may be the deciding factor. Other factors than those of engineering design may require consideration. A concern's funds may be sufficient for the development of only a part of the possible head, and the remaining work may have to be postponed until more money is available. The effect of these and other causes has been that while there are many successful projects for heads between 1500 and 2000 ft., there are few where the head exceeds the latter figure.

Impulse Wheel Essential

All high head plants, in the sense in which the word is used in this article, are necessarily of the impulse-wheel type. Although the upper limit of head for reaction turbines under favorable conditions has been raised materially during the past few years, and there is no reason to believe that the 800-ft. head, 25,000-hp. vertical units recently built by the Pelton Water Wheel Company for the Kern River No. 3 Plant of the Southern California Edison Company represents the absolute maximum, any considerable extension along these lines is improbable. Heads appreciably above this figure enter the realm of unquestioned dominance of impulse type of unit.

Probably the highest head water-power installation in the world is situated at Fully, a short distance from Martigny, in the Rhone valley, Switzerland. The static head at this plant is 5412 ft., and the normal effective operating head is 5320 ft. Water is taken from an Alpine lake, whose elevation is 7000 ft. above sea-level, and conveyed by means of a tunnel 1650 ft. long and a pipe line 15,000 ft. long to the plant.

The entire hydraulic installation was designed by Piccard, Pictet & Company of Geneva, Switzerland. There are four units, each with a capacity at full load of 3000 hp., and operating at a speed of 500 r.p.m. These are horizontal, single runner, single nozzle Pelton impulse turbines. The wheels have an overall diameter of 12 ft. and are made of forged steel. Each wheel carries 54 buckets. The jet velocity reaches the enormous figure of 590 ft. per second.

A Famous Italian Plant

Another important high head plant is situated at Isola, Italy, and receives its water supply from the Lago d'Arno. This lake is tapped at a point 82 ft. below the normal water surface and conveyed through a tunnel and penstock to a power house. The average effective head is a little less than 3000 ft. There are seven impulse turbines each developing 6000 hp. at full load and operating at 420 r.p.m. The wheels have a diameter of 9.9 ft. and the jet velocity is 443 ft. per second.

Like the Alps, the rugged coast of Norway furnishes some important opportunities for hydroelectric development. One of the highest if not the highest head plant is that of the Norsk Aluminium Company, at Hoyanger, which supplies energy for the electric furnaces operated by this company. Water is obtained from two mountain lakes, at different elevations. The effective head of the upper supply is 2400 and of the lower supply 1800 ft. The hydraulic equipment consists of seven 4500-hp. impulse turbines built and installed by the Pelton Water Wheel Company of San Francisco. Three of these operate under the 1800-ft. and three under the 2400-ft. head. Under normal conditions, the seventh unit is idle, but it is arranged for operation under either head. By this arrangement, in case of trouble with either pipe line, this unit can be placed in operation using water from the remaining line, and, with the three units regularly supplied from this line, carry the load temporarily. Similarly, this seventh unit can be substituted in case of trouble with any individual turbine.

Western Plants Use Pelton Wheels

In the western states there are a number of relatively high head installations, but as far as can be learned, none, at the present time, equaling the plants described above. What is perhaps the highest head in the United States is a plant near Pike's Peak in Colorado, which operates at a static head of 2350 ft. and an effective head of 2100 ft., developing 3000 hp. Another high head installation is the Big Creek No. 1 of the Southern California Edison Company, of 2100 ft.

That the West is self-sufficient in the manufacture of this class of machinery is indicated by the fact that a large proportion of these plants are equipped with impulse wheels built by the Pelton Water Wheel Company. Among these may be mentioned the Drum plant of the Pacific Gas & Electric Company, head, 1350 ft.; the Spring Gap plant of the same company, head, 1860 ft.; and the Rush Creek plant of the Southern Sierras Power Company, head, 1700 ft.

Successful Use of Electricity for House Heating in Peru

Copper Mining and Smelting Company Operating in Peruvian Andes Makes Efficient Use of Surplus Hydroelectric Power for Camp Heating at a Saving Over Steam

By A. S. KALENBORN
Engineer and Manager, Rieber Laboratories, San Francisco

WITH increasing cost of fuel and decreasing cost of hydroelectric energy, the use of electricity for heating will find an ever broadening field. The term heating is used in the inclusive sense of cooking, and water and room heating by electrical means. It is the relative cost and convenience that determines the use of various commodities. For instance, where bricks are cheap and timber expensive one finds most houses built of brick, and vice versa. Aside from the convenience and cleanliness of electricity as a heating medium, there are many isolated cases where it is more economical to use electrical energy exclusively for general heating. The writer had occasion, recently,



The lower story of the stone building above, which is designated by the letter "H" in the tabulation at the bottom of the page, was used as offices for the mine executives, with lodging quarters above, containing one permanent roomer and five extra beds. The frame building "I," to the right, which was the railroad depot, contained three offices below and five permanent roomers and four rooms for transients above.

while in the employ of a large copper mining and smelting company in the Andes Mountains of Peru, to study several cases of camp heating with hydroelectric power.

In one of these cases, at the coal mine of the

company, a steam heating system for the cottages and buildings took its steam from the same boilers that furnished steam for a surface inclined hoist. Before electrification of the hoist, about 10 per cent of the steam produced was charged against steam heating. After putting the hoist on electric drive, it was found that conditions were almost reversed, the heating system, drawing continually, taking a great deal more than the 100-hp. hoist for its intermittent operation. The steam heating system was therefore discontinued, and electric heating for room and water heating substituted at a considerable saving per month.

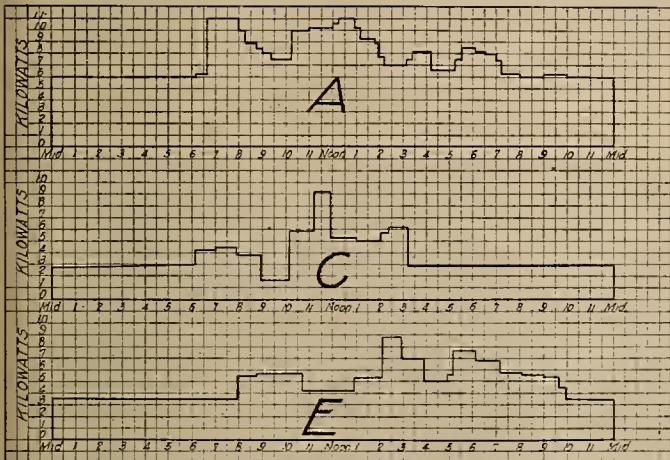
At the copper mine, where a steam reserve was maintained, it was found after a careful study, that heating by long steam pipes to scattered buildings was very wasteful, and that further economies were effected by heating only the group of buildings near the steam plant with steam, and heating the outlying buildings electrically. At the copper mine, where no steam reserve was in use, practically all of the room and water heating was done electrically. At the hydroelectric camps practically all heating and cooking was done electrically. As there were no individual meters, the use of electricity here would represent the maximum that could be expected for such use, as no restrictions were placed on the full use of power required for comfort and convenience. Several months after the complete installation of these "electric homes," a study was made of the various loads. A curve-drawing wattmeter was placed on each load for two days, most often without the knowledge of the "customer," and from these records the tabulation below was made up. The buildings ranged in construction from a substantial two-story stone office building with sleeping rooms above, to small corrugated iron sheds or shacks where the native oilers and workmen about the plant lived.

Building.....	A		B		C		D		E		F		G		H		I		J	
Construction.....	2-Sto. Ad.		1—Adobe		1—Adobe		1—Adobe		1—Adobe		1—Cor. I.		1—Cor. I.		2—Stone		2—Frame		1—Cor. I.	
Rooms.....	8 & Bath		4 & Bath		4 & Bath		4 & Bath		4 & Bath		4 & Bath		9 & Bath		11 & 2 Bath		15 & Bath		11	
Occupants.....	8		2		2		3		5		4		6		"a"		"b"		"c"	
Cubic Feet.....	23,300		13,400		10,000		10,000		10,000		7,200		13,000		51,500		70,400		12,260	
Temperatures.....	76° to 32°		68° to 24°		66° to 40°		66° to 30°		68° to 30°		68° to 22°		76° to 28°		62° to 36°		54° to 40°		64° to 30°	
Apparatus.....	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.	No.	K.W.
Water Heater.....	1	2.50	1	1.25	1	1.25	1	1.25	1	1.25	1	1.25	1	1.25	2	2.50	1	1.25	4	5.00
Air Heater.....	5	6.25	2	2.50	3	3.75	4	5.00	4	5.00	3	3.75	4	5.00	12	15.00	7	8.75	4	5.00
Range.....	1	7.00	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	14	.84	39	2.34	52	3.12
Lamps.....	55	3.30	6	.36	12	.72	13	.78	12	.72	9	.54	14	.84	39	2.34	52	3.12	13	.78
Toaster.....	1	.60																	3	1.80
Flat Iron.....	1	.60	1	.60	1	.60			1	.60	1	.60	1	.60	1	.60	1	.60	1	.60
Con. Load.....	20.2		8.71		10.32		11.03		11.57		10.14		6.44		20.44		13.72		8.18	
Max. Demand.....	11		5.3		9.1		7.9		8.9		7.8		4.2		15.0		9.7		7.2	
Dem. Factor.....	54.5%		61%		88.2%		70.9%		77%		77%		65.3%		73.3%		70.6%		88%	
Min. Load.....	6		4.4		2.6		2.6		3.1		3.7		2.1		13.8		7.0		1.8	
Average Load.....	7.5		5.06		3.54		4.70		4.70		6.05		3.40		14.47		8.34		3.2	
Load Factor.....	68.3%		95.5%		39%		59.5%		52.8%		77.7%		81%		96.5%		86%		44.5%	
Watts per Cubic Foot.....	0.32		0.38		0.35		0.47		0.47		0.84		0.26		0.28		0.12		0.26	

Note.—"a" Four people in offices; one permanent roomer above, also 5 extra beds.
"b" Three men in offices; five permanent roomers above, also four transients.
"c" Twelve natives; oilers, carpenter and stable man.

The tests were made during June and July, which below the equator correspond to our northern winter months, in a climate somewhat more severe than San Francisco's. The altitude is about 12,100 ft. at this camp; there was not much wind during the time of the test, and the air is quite dry. In computing cubic feet of air space the outside plan area of the building was multiplied by the height to the roof plate, or eaves. Temperatures were obtained from maximum and minimum thermometers installed in a standard, weather bureau, ventilated box. The ten houses included are designated by letters, with all pertinent data given in the vertical columns below each letter.

Three load curves have been drawn to show the nature of the fluctuating demand, which varies considerably in the cases shown, there being no typical curve except in a very general way. It is hoped that



A curve-drawing wattmeter was placed on each load for two days, most often without the knowledge of the "customer." Three representative curves are shown above. Due to the various uses to which the buildings were put, with consequent fluctuating demand, no thoroughly typical curve occurred.

the data given will be of use to others who have similar conditions to meet.

On account of war conditions and the length of time necessary to get standard heating apparatus from the "States," we were compelled to make our own apparatus. This original layout is probably being replaced, as it wears out, by stock devices. In house "A" the electric range and two air heaters were "standard," all the other apparatus having been built in our own "hydro" shop.

Some details of the various buildings referred to in the tabulation of the previous page are as follows:

- "A"—Superintendent's home. A two-story adobe, substantial building, with fireplace. Total of eight in the building.
- B—Mechanic's home, one story, adobe; man and wife.
- C—Chief operator, one story, adobe: man and wife.
- D—Operator: man, wife and small boy.
- E—Engineer: man, wife and three children above 10 years.
- Note: Cottages C, D, E, identical in size and construction.
- F—Surveyor: man, wife and two small children. Building of corrugated iron, with cloth and paper lining on wood. Small fireplace.
- G—Bunk house for unmarried men. Corrugated iron, cloth and paper. Water heated in water-back in fireplace in assembly room.
- H—Administration Building: two-story stone, offices below, and rooms for transients (at railroad junction) on second floor.
- I—Railroad depot: two-story, wood, frame and clapboards. Offices below, railroad men's rooms above. One-third of cubical space as depot.
- J—Oilers' Row. A motley row of corrugated iron, shed-like buildings, housing five native families.

Airplane Forest Patrol Makes Good Western Record in 1921

Cooperative Project Undertaken by the Forest and Air Services Effective in Spotting Fires From the Air

IN view of the discontinuance of the appropriation which made possible the cooperation of the Air Service and the Forest Service in patrolling forested areas by airplane, interest attaches to the results of this season's work in spotting forest fires from the air. The effectiveness of air patrols equipped with radio, is shown by the statement of the Forest Service that during the 1921 fire season in California of 595 fires reported by airplane, 288 were "spotted" within one-quarter of a mile of exact location and 422 had been reported to Forest Service men within ten minutes after discovery. In Oregon this season



The mountainous regions of California are covered with sufficient frequency so that hardly a locality exists that is not acquainted with the wide-spreading wings of the Army plane and the purr of the Liberty motor.

653 fires were reported. Of this total 482 were reported by radio from airplanes and of these 339 were reported to Forest Service stations within ten minutes of discovery by the aerial observer.

It is now pointed out that radio compasses at the landing fields could be used very effectively in locating a plane circling over a fire. With radio compasses at two or more ground stations whose distance of separation is known, the exact position of the fire could thus be readily located on the map. This plan would obviate the necessity for an observer in the plane, as the pilot could easily trip an automatic transmitter that would operate while he was over the fire.

Many instances are cited to show the superiority of airplane observation for this work as compared to the lookout stations maintained by the Forest Service: in case of large conflagrations Forest Service officers can be taken for aerial reconnaissance, thus saving invaluable time in organizing the fire fighting forces. Where necessary, serial photography may be used as an aid in planning method of attack. In the case of small fires in rough country the aerial observer can spot the location more accurately and usually quicker than the "lookout" or observer stationed on a mountain peak. These mountain stations, however, are to be continued even if the plan of air patrol is again made possible.

Commercial Cooking as a Desirable Central Station Load

Increased Revenue, Non-inductive Load and Large Diversity Factor as Shown in United Service Restaurant, Suggest Commercial Cooking as a Field with Great Possibilities

By W. W. WEIR
Manager, "Electric Home" Department,
Great Western Power Company

COMMERCIAL cooking offers to the power companies of the West a field but little scratched, yet one in which the opportunities for pioneering are many. An abundance of hydro-electric power, and low rates and the desirability of such a load places electricity in a position to compete on almost equal terms with gas, coal and the various petroleum products used for this type of service at the present time.

The installation of electric cooking equipment in a restaurant of the size and type of that recently opened by the United Service Corporation of San Francisco, marks a forward step in this field of commercial cooking. With a connected load of 158 kw. included in the various cooking devices, in addition to a 10-kw. lighting load and 27 hp. in direct current motors, this restaurant is the first in the West which can be termed "completely electrified."

The fact that a load of this type is highly desirable from the point of view of the central station has not been appreciated by a majority of the power companies, due mainly to a lack of information as well as proper investigation by the various companies themselves. This investigation will have to be borne by the larger companies, for the present at least, or until such a time as this method of heating and cooking becomes more universally used. The time is rapidly drawing near when it will be brought home to the electrical industry of the West that despite the progress that has been made in hydro-electric development, the East is forging ahead in the utilization of electric power for heating and for cooking.

There are many reasons why electric cooking in either hotels or restaurants should prove a desirable load for the central station, aside from the increased revenue involved. In the case of an ordinary restaurant where the central station would receive approximately \$50 per month for furnishing power for operating the one or two small motors which might be used for lighting, the revenue might easily be increased to \$500 per month were electric cooking equipment installed. Certainly that is a powerful argument for promotion of this type of load by the power companies. While it is true that the greatest demand for power from such a load would occur at peak hours, especially in the cases where the central station was acting as a feeder for traction lines, it is equally true that the demand would extend over a greater period and would be more evenly applied. Load curves developed in the case of the United Service Corporation restaurant, while following the ordinary power curve, are more regular and tend to fill up the gaps which the power

curve shows. The fact that electrical cooking and heating equipment is a non-inductive load in nearly all cases and that it has a large diversity factor are further reasons why it is a desirable central station load. These two facts alone are sufficient cause for a more thorough investigation of this type of load.

A list of the electrical equipment installed in the San Francisco restaurant demonstrates the extent to which electricity has been applied to its operation. A list of this equipment follows:

1 Edison Bake Oven	11 kw.
3 Edison Hotel Type Ranges	22 kw. each
1 Edison Griddle	9 kw.
1 Edison Waffle Iron	6 kw.
1 Edison Broiler	9 kw.
9 Edison Coffee Urn Heaters	16.2 kw.
9 Edison Dish Warmer Units	16.2 kw.
4 Wesix Water Heaters	24 kw.

The load represented by this cooking equipment totals 158 kw., which would have been lost to the power company had not the restaurant been electrically operated.

The restaurant equipment also includes one Autosan dishwasher; a complete electrically operated refrigeration plant which has in addition to the main unit, small cooling compartments at points in the dining room; a potato peeler, a meat cutter, and a bread slicing machine. These with the elevators and the ventilating system comprise the 27 hp. direct current load.

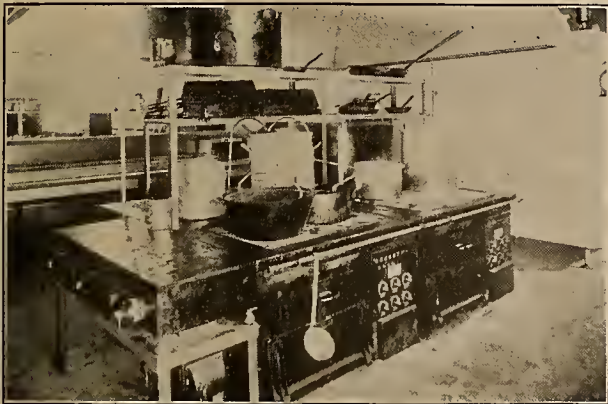
The Sturtevant suction ventilating system draws 12,000 cubic feet of air per minute from the kitchen, the dining room, the storeroom and pantry in the basement, exhausting it outside of the restaurant, thereby carrying off all odors of cooking and baking.

The majority of the appliances are attached to a two-wire 220-volt system and all are controlled by externally operated individual Trumbull switches. The feeders consist of two 800,000 circular mil cables and one 00 cable, the third wire being installed to care for the smaller appliances which were wired for a three wire 110-220-volt system.

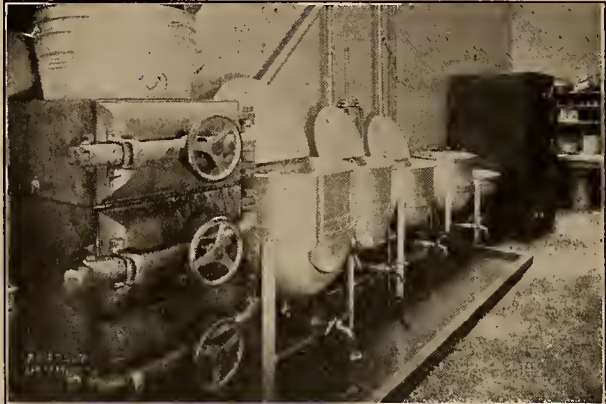
It might be said that there probably was never an installation of modern electrical equipment which was dedicated with more interest than was that of the United Service Corporation. The opening day was reserved for the San Francisco Electrical Development League and the men who addressed the members were unanimous in their belief that commercial cooking will provide a large source of revenue for the western power companies during the years to come.

San Francisco Has Completely Electrified Restaurant

One of a Pictorial Series Featuring Interesting Applications of Electric Service, Advances in Home, Industrial and Power Construction and Noteworthy Developments in Western Progress



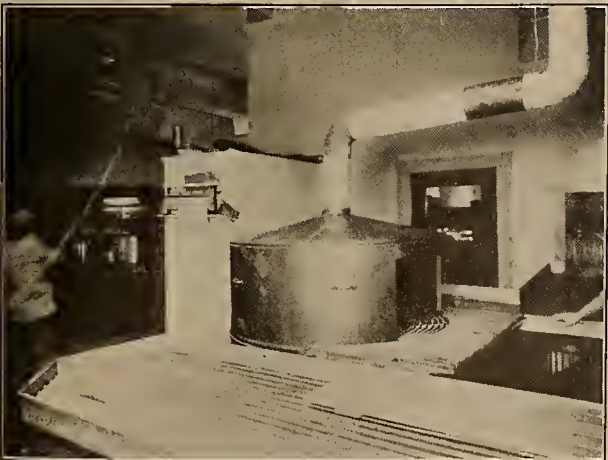
Two of a battery of three large electric ranges in the kitchen of the restaurant where most of the cooking is done. In the foreground is the electric griddle.



The pressure cooker and the soup kettles are operated by steam which is generated in the basement in an electrically heated boiler which also furnishes the hot water.



THE first completely electrified restaurant in the West, the United Service Restaurant, in San Francisco, at its dedication by the Electrical Development League of that city. The restaurant has a capacity of 325, the main service being from two huge horseshoe shaped counters, there also being small tables. In it all the cooking, heating, baking, dishwashing, ventilation and refrigeration is done by electricity. The installed capacity is 158 kw. alternating current, exclusive of lighting which is 10 kw. In addition 27 hp. of direct current motors are used.



This electric dishwasher is one of the latest developments in this line for heavy duty work. It is operated by one man who washes the dishes as fast as they can be placed in its interior and removed. Alternate jets of soapy and fresh water are forced against the dishes.



A view of the interior of the restaurant looking toward the kitchen shows the serving counter under which are electrically heated plate ovens. Immediately behind the serving counter are the steam tables and a complete equipment of electric toasters and waffle irons.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in
Every Line of Business

THE SALESMAN HIMSELF

Have you ever stopped to think whether it is really true that the proof of the pudding is in the eating? Think it over very carefully, and see whether you will not agree with me that its real proof lies in the remembrance you have of it the next morning. You may have liked it while you ate it, but if the doctor has to call at your house for a week or so after the eating you will hardly ever eat that pudding again.

One of the greatest mistakes a salesman can commit is not to think of the way in which he and his sale will be remembered by the buyer. He forgets that enormous amounts of money are spent annually by the shrewdest business men to build up those remembrances in their customers' minds which are collectively called good-will. A customer who remembers you not unfavorably, not indifferently, but distinctly in a favorable way is not only your best walking advertisement but a valuable asset to you as a prospective buyer of the things you sell. Remember this carefully, and sell not only with your eyes on the immediate sale you are making, sell so that even in case you lose the immediate sale the remembrances the buyer retains of you will bring him back to you with a definitely friendly feeling towards you and your goods.

Personality Remembrances

If you try to explain why certain people have left in you a memory of pleasant personality, you will probably be unable to state the reasons except in a vague way. Try it with those whose personality is unpleasant to you, and you will not experience the same difficulty. Your reasons will be short, definite and quite to the point. It is hardly possible to tell people how to develop a pleasant personality. It would be so much easier to say what not to do to escape being unpleasant, only this would not help, because you must try to be definitely pleasant, and not inoffensively only.

To make the matter brief, that man is always counted as an agreeable and pleasant person who always shows kindness, interest, and tolerance toward his fellow-men.

It is not hard to make yourself agreeable to others. All you have to do is to remember that you are not the only one in the world who has trials and problems to contend with, and that the other fellow comes to you to solve his problems with the justified expectation that you will try to help him as a matter of your business. Size yourself up on this count. Do you ever permit yourself to take your grouch out on the other fellow? Do you ever regard a cus-

tomer as a nuisance whom you barely have to tolerate? Are you merely indifferently polite, or do you always consciously try to be agreeable even to grouchy customers? Put your present score down and see how easy it is to improve.

Dignity and Tact

Dignity is not insolence, nor is it servility. Do not bully your customers, but also do not cringe before them. Do not make them feel that you condescend to them, but neither should you abase yourself before them. Do not insult people who are trying to buy something from you; but on the other hand do not tolerate any deliberate insults on their part. The poise required to leave a lasting pleasant impression on the customer will come to you quite naturally as a result of sincerity and earnestness of purpose on your part in the exercise of your selling service, once you have firmly grasped the true relation of the seller to the buyer.

We all, without exception, dislike tactless people, and having once met with one always try to avoid dealing with him or her again. Tact is easily acquired if we stop to think of the other fellow first and deliberately try to avoid doing or saying anything, no matter how true, that might offend him or be unnecessarily unpleasant to him. People do not like being shown up. The United Cigar Stores Co. prohibits their salespeople even from correcting the mispronunciation of brand names by customers. Do not lecture to people. They do not like it, and they do not come to you for the purpose of being lectured to,—they come to be sold.

You certainly know more in your special line than the layman who comes to buy from you, but is it the main purpose of your business to convince him of this superiority, or to sell things to him? This point is so simple and obvious, and still this type of tactlessness is an every-day occurrence among salespeople whose attention has not been called to it.

Performance Remembrances

Not only your personality is going to be remembered by your customer but the way you do business with him. Ordinarily we understand very well that the way in which an employe performs his duties is subconsciously reflected upon his firm or employers, but have you also noticed that we usually gage the character of the firm indirectly but definitely by the character of work it tolerates on the part of its employes? Of course, it is poor logic for the customer to think thus: "The performance of this employe of the firm is very inefficient; therefore the firm itself is not very efficient; and therefore the article produced by it cannot be very good and is not

worth buying." Still, no matter how incorrect this kind of thinking, the important point is that subconsciously the customer is always inclined to arrive at such a conclusion, and that a number of sales is lost in this way.

No matter how you liked the personality of a salesman who sold you some electrical Christmas gifts to be delivered at certain addresses and on Christmas Eve, you would hardly ever be tempted to trade again at the same store if it happened that to some of your friends wrong articles were delivered, to others the presents arrived a week late, to others again they arrived as C. O. D. packages, and finally that some presents were never delivered at all. Repeated investigations of a number of stores show that such errors are caused in the vast majority of cases directly by inaccurate and slipshod work of the salespeople. Are you ever guilty of similar slipshodness and inaccuracy? Most probably you are, just as everybody who does not systematically acquire the habit of most rigid accuracy of performance. Use the self-scoring method, and improve your score as fast as you can. And when you have reached the 100 mark on this point, watch yourself hard so as to keep it there.

"Promptness is the courtesy of kings," said a French king. Of course, being good republicans and democrats we are opposed to kings and to everything that smacks of kings. But that is no reason at all why we should be habitually lax in keeping our appointments and being five minutes late.

In his eagerness to make a sale the salesman is continuously tempted into statements which are exaggerated and into promises which cannot be made good. Things like that are, of course, eventually found out by the purchaser, and he will thereafter always regard you as an unreliable person whose word has to be accepted with a mental reservation. Should you be found to be unreliable, no matter how brilliant a salesman you are otherwise, you will soon discover that your apparently commonplace competitor will constantly get the best of you if and when people find out that his word can be relied upon always and under all conditions. If you exaggerate or over-promise sometimes through sheer carelessness, and not from over-eagerness, watch yourself, and unlearn that habit.

Service Remembrances

After all, a salesman is appreciated by the buyer in direct proportion to the benefit which the buyer receives through the salesman. Hence the strongest class of memories the salesman leaves with his customers are the "service" remembrances, which are, in essence, the reflections in the buyer's mind of the various demonstrations of interest which the salesman takes in the buyer's affairs and circumstances.

Think for the buyer's benefit; avoid overselling and overstocking him; prevent him, as far as it is tactfully possible, from buying poor or useless things and you will earn the enviable reputation of being a considerate salesman. Thinking for the other fellow's benefit is not enough, you have to act for his benefit, too. Remember all the time that you are

his adviser, assistant, helper. Try to remember what you do to help your customer, and record your score.

Even this is not sufficient, if you want the memory of your selling service to be so firmly implanted in the minds of your customers as to be of real value to you in your future work. You will have to exercise all the inventive faculty you possess, and to do so in his favor. Of course, you are all the time trying to be as resourceful as you can—in your own favor. That is natural, and may earn you the admiration of your customers, but not their gratefulness. And it is the latter that you are after. How many real improvements, not fictitious ones, are you suggesting to your buyers? Do you go out of your way to study things from their angle? For instance, do you try as hard to invent ways to save money to your customers as you do for yourself? With rare exceptions, the average salesman will have to rate himself fairly low on this score, at the start. But by putting that score down quite frankly, and by rating himself as frankly again at regular intervals of time he can attain a satisfactory improvement on this point and he will rise in the esteem of his customers.

Tacoma Will Test Cushman Power Site

City Council Votes Appropriation to Continue Power Project by Making Test Borings at the Lake Cushman Dam Site

A new development in the Tacoma power situation is reported in the action of the council to provide \$16,000 for test borings at the Lake Cushman dam site. This action follows the recent controversy which arose between the city and the state fisheries commission over the right of Tacoma to impound waters at that point and is an expression by the council of its confidence that the matter will be settled in the city's favor. At the present time, the decision of the lower court is against the right of Tacoma to condemn two necessary tracts of land, because of the interference with fish propagation. The matter will come before the higher court in May or June of this year.

Another element in the situation is the offer of the Tacoma Railway and Power Company which makes possible "overload" power for the city at a rate of ten per cent less than it could be produced at the proposed Lake Cushman plant. The company recently announced a higher rate for the standby power which it furnishes the city, but apparently an agreement has been reached by which this increase will not be put into effect until March. This means considerable saving to the city, which has had to lean heavily upon power company service during the cold weather.

The Tacoma News-Intelligencer has the following suggestion to make:

Would it not be well at this time for Tacoma to procure the greatest electrical engineers available and have them make a survey of the present situation that the citizens of Tacoma, who are stockholders in the municipal plant, may know exactly where and to what purpose they are going? We must not wake up after several years to find that improvements and additions have been constructed at such a cost as to make it impossible to maintain present low rates.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Automatic Substation Equipment Cuts Railway Expenses

Heavy expense incident to the manual operation of substations will be eliminated by the Oregon Electric Railway of Portland with the installation early this year of automatic railway substation equipment in all of its stations, with the exception of one, by the General Electric Company, which recently announced the receipt of an order for this equipment, which will make the operation of the 180 miles of this line entirely automatic.

The order comprises automatic control for seven synchronous converter substations, replacing the present manual control which has been in operation since 1912. The stations to be changed over are at Moffett, Tonquin, Pirtle, Lassen, Waconda, Cartmey and Orville. At Moffett and Tonquin there are two 500-kw. 600-volt converters connected in series giving 1,000 kw. at 1,200 volts for each. The remaining five stations have single unit 500-kw. 1,200-volt converters installed.

The automatic control will include the standard practice of separate excitation of the converters to insure correct polarity at starting. This is an important feature on account of the difficulty experienced in correcting the polarity by reversing the fields of these machines. The separate excitation method gives positive assurance of correct polarity at every start.

Designed along standard lines for present railway practice, the equipment at each station will consist essentially of a motor driven drum controller, ex-

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

citer, contactors, switches and relays with protective devices and load limiting resistors. The exciter which is operated by the same motor as the controller, will provide the separate excitation. The stations will be connected to the line or shut down in accordance with the power demands from cars.

The automatic control of these stations will eliminate the heavy expense for attendance except for periodic inspections, and will also reduce the power bill by shutting down the machines when there are no cars on the section instead of allowing them to run.

The Oregon Electric Railway, an interurban line owned by the Spokane, Seattle and Portland Railway, is operated at 1,200 volts direct current stepped down from a transmission line voltage of 60,000 at 33 cycles. The present rolling stock consists of 62 motor cars, 28 trailers and ten 50 to 60-ton freight locomotives.

Rules for Marking Freight and Express Shipments Issued

The Forest Products Industrial Research Laboratory, maintained by the U. S. Department of Agriculture in co-operation with the University of Wisconsin at Madison, Wis., estimates \$500,000.00 as the daily loss to shippers and manufacturers due to poor packing and to expensive and improperly designed containers for all kinds of domestic and foreign shipments. The Laboratory has cooperated with manufacturers in improving the packing of widely varying types of commodities. In many instances these tests resulted in the redesign of the container. The new design gave increased strength and often decreased the amount of material used in its manufacture; added to the security against pilfering; decreased the cubic contents; reduced the labor and cost of manufacture; made possible more rapid production of packages, etc.

The work of the Laboratory includes practical instruction courses in boxing, crating and kiln drying given at the Laboratory. The object of this course is to demonstrate the principles that underlie proper box and crate construction and to supply information which will be of assistance in developing economical containers that will deliver the contents in a satisfactory condition at a minimum cost.

In this connection the laboratory has recently issued the following list of rules to be observed by shippers, especially where shipments of machinery are included:

Marking

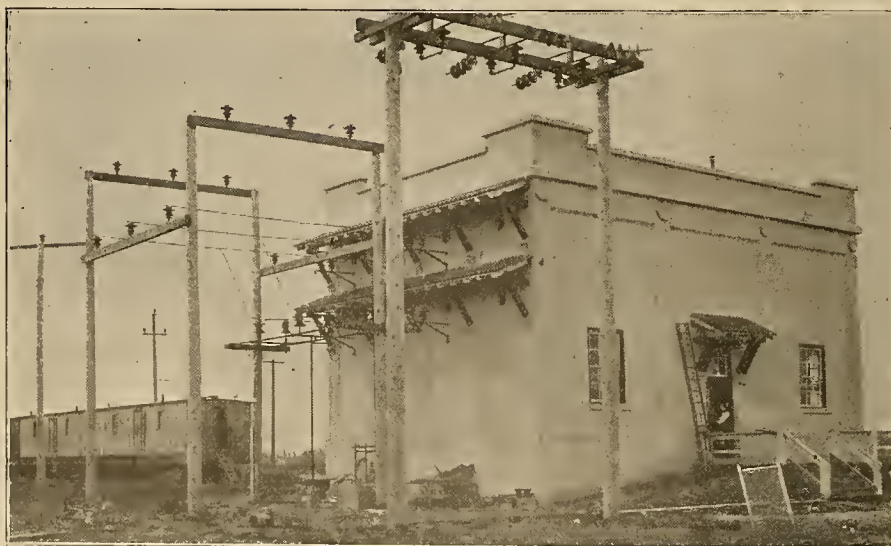
1. Show full name of consignee, destination and state. Do not abbreviate.
2. Show county, where there are two or more towns of the same name in state.
3. Show street address at all times.
4. Show initials of destination road if certain delivery is desired.
5. Show "FROM" or "MANUFACTURED BY" preceding shipper's name and address.
6. Erase or obliterate old marks if second-hand package is used, avoiding use of such as far as possible.
7. Name and address of shipper and consignee on inside of package will insure delivery if outside marks are lost or destroyed.
8. Use marking pot and brush for marking packages having uneven surfaces.

Billing

1. Arrange your shipping instructions so the Shipping Order will be on top.
2. Write plainly. Use typewriter.
3. Do not see worn or poor carbon paper. See that all copies are lined up properly.
4. Be sure shipping instructions agree with marking on packages.
5. Describe freight fully, accurately and be sure to verify.
6. Show actual gross weight on bills of lading and shipping orders.

Delivery to Carrier

1. Deliver your freight to railroad station early in the day and have all express shipments ready as early in the day as possible.
2. Do not split your shipment but deliver complete to avoid delay.



The Pirtle Substation of the Oregon Electric Railway near Portland, whose operation will be made entirely automatic by the installation of new equipment by the General Electric Company.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Contractor-Dealer Sells Fifty Washers in Ten Days

Selling fifty washing machines in ten days is somewhat of a record for one contractor-dealer to establish in a town of fifty thousand inhabitants. The Sanders Electric Appliance Company recently established this record in Pasadena in the Los Angeles district.

Two novel and extraordinary methods were employed by this store to create interest in electric washing machines in the territory which it serves. For one thing the regular family washing of the owner is done in the window every week. Consequently the housewife passing this electric shop does not see an ordinary demonstration but the real every-week task of the housewife. The advertisements for the store are written with this in view.

The second feature of the merchandising methods employed to establish this record was the use of less time to talk mechanics to the prospective purchaser and more time to indicate genuine interest in the home problem, its difficulties and what the labor-saving, time-saving electric washing machine will do toward solving this problem.

Two open delivery wagons and a corps of trained salesmen were used during the campaign that sold the fifty washers. A washer was mounted on each wagon with appropriate legends on the side telling the story of the convenience of the "electric way" of doing the family wash.

This same appliance store recently secured wide publicity when a quantity of United States currency was washed and ironed with ordinary household electric equipment in the shop window.

The Family Budget and the Electric Appliance

Some Points to be Used in Sales Arguments Developed by the Experience of a National Bank in Denver, Colorado

By S. W. BISHOP

Executive Manager, Denver Electrical Cooperative League

More and more are thinking people applying scientific management to the conduct of their homes. It is because they appreciate the possibilities of economical administration, the reduction of operating and overhead expenses.

Is not home management as much of a necessity as sound management of business? Recent experiences of a national bank in Denver proves that it is—likewise that interest is rapidly increasing in the subject. Reports of these experiences show that electricity in the home is one of the biggest factors in bringing this condition about.

When the Denver bank asked for experiences in budgeting and household accounting, it was with the view of enlarging the business, of securing additional accounts, after the valued possibilities of its special service had been discerned. Cash prizes were paid for the best bona fide experiences and it is interesting to note that in nearly every case some reference was made to the use of electricity.

In order that a fuller appreciation may be had of the direct references to electricity, some representative excerpts follow:

Experience No. 14.—"Our biggest saving is in operation. With the use of a washing machine, vacuum cleaner, sewing machine, electric iron and other modern conveniences, outside help is dispensed with."

Experience No. 15.—"Use electric washer and mangle. We will soon have this equipment paid

for in what has been saved from not hiring laundress with the attendant expense of her lunches and carefare. * * * Press my husband's trousers, neckties, etc., on mangle. * * * Also use electric sweeper, sewing machine and other electrical appliances."

Experience No. 16.—"Our expense for operation has been low for the reason that our house is new and equipped with electrical conveniences, such as a sweeper, electric sewing machine, electric ironer, etc. I would rather do my own housework with these labor saving devices than hire outside help."

According to the figures submitted with this last experience, the electricity consumed for all purposes during the first eleven months of 1921 was \$25.90, or less than one per cent of the total household expense for that period.

The bank in issuing an elaborate circular on these experiences (and from the electrical industry's viewpoint they are "testimonials") stated that it was published for the information of those who are studying how best to adjust their expenses to their incomes during the present year.

Therein lies a big selling point for the contractor-dealer. Nearly every housewife must occasionally make such adjustment of expenses and it is then when they should be sold on the "electrical home" idea. The quoted experiences all specifically refer to the lessened cost of operation of the household through the use of electrical equipment and that is the idea which can be valuably used by the progressive electrical merchandiser.

Salesmen of all types of electrical household appliances can well afford to capitalize and make this feature the main point in their general sales talks. The voluntary expressions received from Denver housewives shows that this is the phase in which thrifty women are especially interested at this time.

It is also admitted that the vast list of prospective purchasers is that of the middle class—not the ultra rich or the poor—but that group having an income which makes possible the fullest enjoyment of home life. That income can be made to go farther through the use of electricity in the home and it's up to the industry, especially the electragerist, to point the ways and means, or in other words, to sell the appliances which will reduce the household operating expenses.

Conservation of time, labor, health and money are possible through the use of electric appliances in the home but at this time the last factor—money—as expressed in reduced operating expense, should be stressed.



The Sanders Electric Appliance Company of Pasadena recently sold fifty washing machines in ten days, conceded to be a record for a city of fifty thousand inhabitants. Novel methods were employed by this southern California contractor-dealer establishment to achieve this high mark.

Progressive Denver Contractor-Dealer Establishments

Cooperation is the Keynote of the Activities of the Electragist in the Chief City of the Intermountain District where Membership in the Cooperative League is 100 per cent



The Denver Electrical Company is one of the most progressive contractor-dealer establishments in the Intermountain District. Clark Rider is the proprietor and manager of this store.



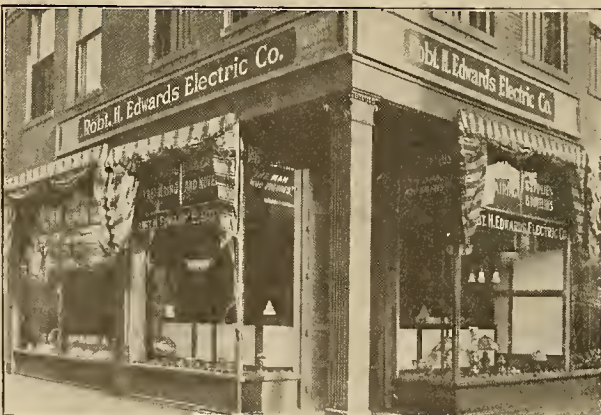
The Williams and Rose Electric Company is equipped to do anything from wiring a home to setting up a pumping plant. It is a standard contractor-dealer establishment in every sense.



The Premier Electrical Distributing Company is a straight appliance shop. Anything for the home can be purchased there. J. Van Dyk is the progressive proprietor of this store.



The Crooks-Nathan Household Appliance Company is the largest exclusive appliance dealer in Denver with the exception of the central station. The store is devoted strictly to the housewife.



Another progressive Denver electragist is Robert H. Edwards, known to his associates as "the man who figures" and "the man who sings." His store has an excellent location.



This is the display and salesroom of the Albert Sechrist Manufacturing Company, specializing in the manufacture of lighting fixtures for the home and pressure cookers.

The Contractor-Dealer and His Advertising Plan

The Elements of Good Advertising and How They May Be Applied to This Branch of the Electrical Industry

By W. D. MORIARTY

Field Representative, Northwest Electrical Service League

Rules of advertising can never take the place of constructive intelligence. They are never intended to do so. At best they call to mind some of the things which long practice has established as tending to produce results. In adding these "Laws of Advertising," therefore, we should add the caution not to take them too seriously. They are intended to help you think, not to do your thinking for you.

Laws of Advertising

These laws have not been assembled in any one text book and no attempt has been made to work them into a harmonious whole with no overlapping. It should be understood also that an attempt to conform to all such laws may lead to weakness rather than strength. The real function of such a list of so-called laws is to show the various ways of approach which have proved effective; and to help a person to analyze advertisements before printing them. What are the sources of strength? What are possible sources of weakness? How could they be improved?

1. The Law of Contiguity stresses the fact that we tend to remember things as belonging together if we see them together repeatedly. This is the basic principle behind the effectiveness of mere repetition of name and product. Pear's Soap.

2. The Law of Sequence stresses the advisability of having the name follow the need rather than vice versa. It depends upon the fact that associations naturally recur in the same direction as they were made and the advertiser wants the buyer to thing the name of his product whenever he thinks of the need of such a product. He gets little reward if a person on hearing Ghirardelli thinks of cocoa. His reward comes only if on thinking of buying cocoa, he thinks of Ghirardelli.

3. The Law of Feeling Tone explains the supposed relationship between the pleasure one receives from the gift of a calendar, or its pleasing design, and the name of the firm. It affirms that the feeling of pleasure aroused by the calendar will make one feel kindly toward the firm issuing it, and that this feeling will tend to produce trade relations.

4. The Law of Fusion is a more sweeping statement of the law of feeling tone. It asserts that anything about an advertisement which pleases a person makes him well disposed toward the firm.

5. The Laws of Suggestion divide all copy into Human-Nature copy and Reason-Why copy. If the thing advertised is one which is purely utilitarian, reason-why copy may be the only appeal as in coal for boilers. If the appeal is purely personal, as perfume, human nature will normally dominate. Even so, however, if the buyer tends to deliberate, reason-why copy should supplement human-nature copy.

6. The Law of Apperception stresses the need of the point of contact. It emphasizes the fact that in proportion as the point of contact is with the need which your article fills, the energy aroused by attention can be utilized to develop desire and confidence.

7. The Law of Assimilation warns against bull-doing methods in advertising. Let your reader feel that he is making the decision. Even experts are submitting their findings to the judgment of the reader. Behind this judgment of the reader.

8. The Law of Nerve Channels emphasizes the figure of speech that just as the channel of a stream is worn deeper by two things, time and volume, so are the channels of association. Five minutes spent over an advertisement is more valuable than thirty seconds.

9. The Law of the Resting Point calls attention to the fact that in pictures in motion the illustration must always show the point where the motion changes, where there is a balance. The more violent the motion the more essential this law. The foot cannot be in mid-air in walking. If the football man is kicking the ball the foot must be at the highest point.

10. The Law of Attention Span. This stresses the importance of not overloading the mind of your reader with too many unorganized ideas. Group your ideas into groups of not over five, and three or two may be more effective. This applies to subdivisions also. Rather than overload, omit some. Effective headlines seldom contain more than five words.

11. The Law of Art Appeal stresses the fact that if any art, music, dancing,

painting, advertising, is to have the fullest art appeal, it must allow the person appealed to to feel himself in the work of art. The advertisement must enable the reader to see himself using the article or happy in its possession.

12. The Law of Yourself or the Law of Personality insists that only as the writer is able to project himself into the business can he write the best advertisements.

13. The Law of Vision is primarily that a man cannot show another what he has not himself seen. He should see more than he tries to tell. And he must see three things, the article (including its uses), the user (and how the article will serve him), and the competing articles. Even though these articles are not mentioned they determine largely the things to stress.

14. The Law of Sincerity stresses the importance of truth as (1) a creator of confidence, and (2) a creator of more vision. Nothing enables you to see the truth like telling it accurately. If your copy is not true in the most vital sense your sales campaign will suffer in the end if anyone else is telling the truth and basing a campaign on it.

15. The Law of Beauty stresses the importance of appealing to the whole man—reason-why alone or human-nature alone or both together, the whole man must be made to feel the appeal of the article, must lose himself in the appreciation of it if only for a short period. Not in the ad but in the article, for the ad is at its best only as it makes a man lose himself in the article.

EDITOR'S NOTE

This is the concluding article of a series written for the Journal of Electricity and Western Industry by Mr. Moriarty.



A SUGGESTION FOR AN ATTRACTIVE EASTER WINDOW DISPLAY

H. L. Miller of Pasadena, has a reputation throughout the entire electrical trade in Southern California for his attractive window displays. The above window drew much attention during the Christmas holidays. Its appeal would be equally eloquent for an Easter window trim.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Will Fight Water Power Act

People's Economy League Is Organized in Los Angeles to Combat Measure

Characterizing the proposed water and power act which will be voted upon by the people of California at the November election as a supremely radical measure, more vicious in its provisions than any similar act ever introduced in the United States, the People's Economy League has been organized in Los Angeles for the purpose of campaigning against the proposed measure in the southern part of the state.

The organization of the People's Economy League is similar to the movement instituted in northern California early in January when the Greater California League was formed to fight against the measure.

The People's Economy League is composed of a large number of prominent Los Angeles business men and women. It includes in its membership the following:

Morgan Adams, Mrs. J. T. Anderson, William H. Allen, Jr., H. L. Arnold, Carrie Jacobs-Bond, Fred L. Baker, Mrs. E. R. Brainerd, R. W. Burnham, Mrs. Rose C. Bryant, Harry A. Chamberlain, Eli P. Clark, O. P. Clark, George I. Cochran, Dr. Guy Cochran, Louis M. Cole, Mrs. O. P. Clark, A. J. Copp, Jr., Herbert L. Cornish, Richard Dillon, Isadore B. Dockweiler, B. H. Dyas, Frank P. Flint, Motley H. Flint, H. W. Frank, H. C. Fryman, Dr. Dudley Fulton, William M. Garland, D. A. Hamburger, M. A. Hamburger.

Dwight H. Hart, George A. Hart, Marco H. Hellman, Jane C. Humphreys, Maurice S. Hellman, William R. Hervey, W. I. Hollingsworth, Sumner P. Hunt, Louis Isaacs, Max Isaacs, W. P. Jeffries, J. A. Jevne, Dr. Milbank Johnson, Henry W. Keller, R. H. Lacy, J. B. Lankershim, Oscar Lawler, Erle M. Leaf, Walter R. Leeds, E. D. Lyman, Robert Marsh, Austin O. Martin, Harry Lee Martin, Edwin A. Meserve, Shirley E. Meserve, Isaac Milbank.

W. W. Mines, John G. Mott, Curney E. Newlin, Henry W. O'Melveny, John Parkinson, Lee A. Phillips, Mrs. Mathew S. Robertson, R. I. Rogers, L. R. Roseberry, Mrs. R. W. Richardson, Victor H. Rosetti, P. D. Rowan, Mrs. Alma Whitaker Reynolds, A. J. Salisbury, Jr., J. F. Sartori, F. B. Silverwood, Mrs. Sloan-Oscutt, Charles Stern, Hugh F. Stewart, Walter P. Story, C. C. C. Tatum, Russel M. Taylor, E. B. Tufts, W. L. Valentine, J. B. Van Nuys, O. A. Vickrey, Mrs. J. S. Valley, Dr. L. G. Vischer, A. E. Warrington, H. M. Wheeler, Dr. Maude Wilde, J. W. Wilkinson.

Both the northern and the southern California organizations are actively engaged in working against the bill at the present time. Debates have been arranged in San Francisco and speakers have been designated to appear before the various commercial, civic and business associations throughout the state. Several bulletins have also been issued. The California Electrical Cooperative Campaign is aiding in the distribution of these pamphlets.



The Southern California Edison Company employs this dog team to carry mail and emergency supplies between two of its remote camps during the winter on the Huntington Lake project.

Dog Team Is Part of Equipment on Construction Job

Year-round construction work on the 13.6-mile tunnel which is to bring additional water through a mountain range into Huntington Lake for power purposes has been facilitated by the Southern California Edison Company through the use of a dog team and sled to carry mail and emergency supplies over the 9300-ft. pass between camps 60 and 61 on opposite sides of the range. The road is impassable during the winter months on account of the deep snow. So rough is the route which must be covered that no attempt has been made to hand telephone lines and ordinary communication is carried on by radio.

The dog team, which was brought from Alaska, is operating through the pass for the second season. The psychological effect on the considerable number of men employed at these remote camps has been found to fully justify the maintenance of the dog team. The regular schedule calls for a one-way trip over the ten-mile road daily. The trip includes a 2000-ft. climb to surmount the pass. When snow conditions are favorable the team can carry loads of 500 and 600 pounds over this route. Although a complete hospital equipment is maintained at each camp, a very comfortable litter can be arranged on the sled if it becomes advisable.

Ordinary supplies are taken in on trucks before the snow appears in the fall.

To Purchase Spruce Holdings

Seattle Company Plans to Operate Government Railroad and Mill

E. S. Grammer, of the Admiralty Logging Company, Seattle, has been given an option and plans to purchase the U. S. Spruce Production Corporation's railroad, built during the war, on the Olympic Peninsula. This option covers the spruce corporation's sawmill at Port Angeles, which was 90 per cent completed when the armistice was signed, and which, when finished, would have cost about \$1,250,000. The mill was planned to cut 400,000 feet of lumber in an 8-hour day, and if operated to full capacity would cut more than 1,000,000 feet per day. It is a double-band sawmill and all machinery will be driven by electricity. Mr. Grammer states that it will take approximately three months to get the plant in operation.

The railroad is 36 miles long and runs from Disque, about 12 miles southwest of Port Angeles, to a point south of Lake Crescent, near the village of Forks. The railroad cost the government \$4,000,000, and will be operated as a private carrier. Mr. Grammer's option provides that he will haul out to a connection with the Milwaukee railroad at cost all government timber salvaged from the forest wreck left by the great windstorm that swept over the Olympic Peninsula about a year ago.

Denver Foundries Ask 10% Wage Reductions From Board

Sixteen Denver foundries employing several hundred workers have applied to the Colorado Industrial Commission for a 10 per cent wage reduction for all employees. Employers, in making the application, state that market conditions have improved to such an extent that many of the foundries which have been running with reduced forces will be able to resume normal production provided the wage reduction is granted. While employees appeared before the commission to oppose the decrease, there is little indication that a strike will occur should the board act favorably toward the employers.

The companies asking for the reduction follow: The Queen City foundry, Capitol foundry, Orr foundry, Denver Iron works, Stearns-Roger Manufacturing Company, Enz Iron foundry, Slack-Horner Brass Manufacturing Company, Plains Iron works, Slack-Haley Brass Company, Safety Seal foundry, Western Iron foundry, Flint Electric and Manufacturing Company, Walker Manufacturing Company, Denver Rock Drill works and the General Iron works.

Events in Washington of Interest to Electrical Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

"After very extended discussion of the whole subject of the utilization of the waters of the Colorado River by the members of the Colorado River Commission, we now have a very clear prospective of the entire field. There is no obstacle in view which appears to be insurmountable. Our differences will be ironed out." A statement to the foregoing effect was made by F. S. Emerson, Wyoming's member of the Colorado River Commission, just prior to his departure from Washington. While it is thought that Secretary Hoover, the chairman of the Commission, feels some disappointment that an agreement covering certain fundamentals could not be reduced to writing and signed by each of the commissioners at this meeting, those who are in closer touch with local sentiment throughout the Colorado basin feel that the commission at its initial sitting accomplished all that could be expected of it. It is pointed out that the public concerned must be given an opportunity to become more familiar with the concessions each locality is going to be called upon to make. Any effort to commit them in advance would do more harm than good, it is believed. The consensus of opinion among the commissioners is that the commission will be successful in working out a plan which will insure the maximum utilization of the river's waters and at the same time distribute these resources equitably among the states which have a claim on them.

The first of the public hearings which is to be held in the Southwest will take place at Phoenix on March 15. Secretary Hoover will preside at this hearing.

That a large control dam must be erected at some point in the Colorado Canyon and that the development of the river must be undertaken as a whole rather than on a sectional basis were points on which the commissioners agreed unanimously. Before the public hearing, the commissioners expect to confer with the authorities of their respective states and it is probable at the next meeting that unanimous approval of several other fundamental plans will be forthcoming. A portion of the remarks of Secretary Hoover at the only open session, which the commission held during its stay in Washington, follows:

"This commission has been established primarily to consider and if possible to agree upon a compact between the seven states of the Colorado Basin, providing for an equitable division of the water supply of the Colorado River and its tributaries amongst the seven states. Such a compact is subject to ratification by Congress and the Legislatures of the various states.

"It is hoped that such an agreement may be arrived at by this commission as will prevent endless litigation which will inevitably arise in the conflict of state rights, with delays and costs that will be imposed upon our citizens through such conflicts. The success of its efforts will contribute to the welfare of millions of people."

All of the members of the commission were in attendance at the Washington

meeting. The personnel of the commission is as follows: Herbert Hoover, representing the Federal Government, chairman; W. S. Norviel, Arizona; W. F. McClure, California; D. E. Carpenter, Colorado; J. G. Scrugham, Nevada; S. B. Davis, New Mexico; R. E. Caldwell, Utah, and F. S. Emerson, Wyoming. The commission has been divided into three divisions so that a systematic division of the work can be had. Messrs. McClure and Emerson constitute the sub-committee which will specialize on a study of the volume of water available, with or without storage. Messrs. Norviel, Scrugham and Caldwell will study the water requirements of the various states, while Messrs. Davis and Carpenter will take up the legal questions involved, which includes a study of the obligations of the United States under the treaty with Mexico, which deals with the Colorado River.

Each of the commissioners spoke at the public session.

O. C. Merrill, the executive secretary of the Federal Power Commission, pointed out that applications already are on file covering 4,500,000 horsepower of the 6,000,000 horsepower which can be developed on the Colorado River. He stated that the Federal Power Commission has suspended all action awaiting the recommendations of the Colorado River Commission. He said that he is perfectly willing to concede that power should be subordinated to irrigation and flood control. He said that the river is capable of producing more power than can be used for generations to come but that reservoirs should be so located as to provide for the gradual expansion of power developments.

Coal Strike Likely

Hope that a coal strike can be avoided has gone glimmering. Representatives of the Federal Government, of the coal operators and of the mine workers are laying their plans with the full expectation that there will be a strike. There had been hope that it could be avoided prior to the action of the operators in the Pittsburgh and southern Ohio districts in posting at their mines a new schedule of wages which are approximately 40 per cent under the existing scale.

While the chances are against a prolonged strike and are against a favorable outcome from the standpoint of the United Mine Workers, there is no tendency to discount the ability of the workmen to bring about a major industrial disturbance, particularly since it is apparent that the bituminous workers will have the active support of the miners in the anthracite region and are very likely to have the help of the switchmen and railroad shop crafts. On the other hand, the non-union coal fields are in a position to furnish the industrial requirements of the country if there is no interference with transportation.

Muscle Shoals Project

The Secretary of War sent Henry Ford's Muscle Shoals offer to Congress on February 2. He made no recommendations but pointed out various advantages and disadvantages likely to arise in connection with the proposition. If it should be decided not to accept the Ford offer, he urged that Congress authorize the completion of the Wilson dam by the government itself. He expressed the belief that the government would be able to recover its investment from the profits which would come from the marketing of the power.

While it is a foregone conclusion that the Ford offer will give rise to prolonged discussion in Congress, the opinion is very generally held that the chances favor its ultimate adoption, due largely to the political pressure which is being exerted in favor of acceptance of the Ford offer.

American Valuation

That the manufacturers of the country are practically unanimous in their desire to secure the final enactment of the American valuation plan, contained in the tariff bill which was passed by the House, was brought out clearly at a convention of the National Association of Manufacturers, which was held in Washington January 30 and 31. The manufacturers declared that the difficulties of arriving at honest foreign valuations are so great under existing conditions as to make American valuation the only alternative. Testimony at the convention brought out that even under normal conditions undervaluation of imported goods is the rule rather than the exception.

Only one delegate to the convention spoke against American valuation. His contention is that the American people will not stand for duties in excess of 50 per cent, and that 500 to 3,000 per cent would be necessary to exclude certain articles of foreign manufacture. He declared that such undervaluation as may take place is comparatively inconsequential and if that were remedied, it would not offset the disadvantages of American valuation, one of which he declared to be a type of governmental price-fixing and an injection of government into business to an unprecedented extent.

Railroad Rates

The outstanding feature of the rate-reduction hearing being conducted by the Interstate Commerce Commission was the testimony on February 4 by Commerce Secretary Hoover. It would be an economic crime, he told the commission, to put into effect horizontal reductions in all rates, thus giving relief to higher priced goods and travel, when the vital mainspring of the country's economic life—the transportation of the products of mine and farm—cannot function freely.

As the hearing has progressed it has become increasingly evident that the members of the commission are going to be absolutely sure that the railroads have an adequate return before ordering any reductions. It is believed, however, that the commission will find some reduction in rates possible and that this will be applied entirely to the basic commodities.

California Railroad Commission Asserts Rights

Interference by Governor Defied by California Utility Board in Powerful Letter Asserting Independence and Confirming Questioned Decisions

The independence of regulation as established by the people of California is threatened by the appeal for revision of rate increases for the Pacific Electric Company and the Southern California Telephone Company, according to the California State Railroad Commission, in an open letter addressed to the Governor of California. The communication is in reply to the recent letter of the Governor, questioning the rate decisions of the commission in these cases.

In their letter the commissioners say that reconsideration had already been given the cases at issue upon formal application according to regular procedure provided by the Public Utilities Act. The commission calls attention to the provisions of the act which define its powers and duties, and adds that it could not act otherwise than in accordance with the law.

Dealing directly with the applications for rehearing of the cases in dispute, the commission says they were not convinced that the rates provided in the decisions, should be suspended; that the rates were made contingent upon the companies spending large amounts of new capital to improve service, and when the companies accepted those conditions and obtained money for that purpose, it did not appear to be in the public interest to suspend rates. The letter then reads:

"Far exceeding in importance any question involved in these particular cases, your letter raises the fundamental issue of regulation as established by the people of this state. The success of this system, as you point out, depends on public confidence and understanding. But it equally depends on full freedom under the law to do exact justice, uninfluenced by any other consideration whatsoever."

The letter then quotes Theodore Roosevelt's letter to John M. Eshleman, president of the commission, some years ago, as follows:

"Your first task will be easy. Elected, as you will be, under a movement responsive to the people and independent of the corporations, you will find it easy to reduce rates where they are too high. Your real task will come later when you have to do justice in spite of the popular clamor to lower them. The test of public regulation will be the ability of public men to do that and to maintain popular confidence in doing it."

Referring to future legislation, the commissioners write as follows:

"We feel certain you concede that we, both as commissioners and as individuals, have as deep and unselfish concern as any one in the state. From the early beginnings in 1910 and thereafter no five men in this state have had, as individuals, more to do with the inception and establishment of regulation than the present five members of this commission. We share with you a measure of anxiety for the future of regulation, but we have an abiding faith in the ultimate good common sense of the people when the real truth is known to them. Regulatory bodies should not be swerved from doing justice because of public criticism any more than they should be misled by the selfish claims presented by corporations."

"You state that you are concerned for the preservation of regulation of public utilities. A like sense of our own responsibility for regulation impels us to reply that while regulation may be weakened by the temporary or local unpopularity of some decisions, it would be destroyed by even the suspicion that decisions were affected by any consideration or influence other than the real merits involved, ascertained after full and careful consideration of all the facts."

While desiring public approval, the commissioners say that the only way to secure and retain public confidence is by being fair and just, and if they must choose between right and temporary popularity, they must choose being right.

The commissioners then deal with the two cases at issue at great length and add:

"In all cases this commission must look beyond the mere question of present rates to that of permanent service. In an expanding state like California service can keep pace with demand only by the constant investment of new capital, but this could not be supplied from earnings, except by rates which this commission should not and does not allow. This outside capital cannot be had unless the companies are permitted to earn enough to pay interest on it, and adequate service cannot be rendered without it."

In conclusion the letter reads:

"The policy that has been pursued in the past is the policy that governs the present commission. So long as we are members of this commission we will be governed by principles of equity and justice and perform our sworn duty regardless of consequences. We propose to fix fair rates, and that means fair both to the ratepayers and to the utility, upon established facts uninfluenced by feeling or patriotism."

The letter is signed by H. W. Brundage, president; H. D. Loveland, Irving Martin, Chester H. Rowell and Stanley Benedict.

California Electrical Safety Orders Near Completion

The revision of the California Electrical Utilization Safety Orders, promulgated by the California Industrial Accident Commission and applicable to all places of employment, is nearing completion and should be ready for final action by the commission and issuance as law within a few weeks.

For many months a general committee representative of all branches of the industry have met with the commission's engineers and made up a draft which will be printed soon and given wide distribution with the request that any criticisms or suggested changes be filed in writing. These recommendations will then be given a revision committee for consideration. Following this the orders will again be printed and brought to a formal public hearing before the commission and then issued as orders.

Lumber Company Will Build City to House Employees

Preparations are being made for the erection of the town of Garner City, near Bray, Ore., by the Long-Bell Lumber Company, which has large holdings of timber in that district and which is planning to begin operations in the tract next fall. About 100 cottages will be erected this year and the town will eventually have 250 homes.

Garner City will be in the center of a large area of timber, which at the present rate of manufacture by the Weed plant in California, will require 20 years in logging. At present 2000 men are working in this area. It is planned to erect a model town with a complete light and power plant, water system, theaters, club rooms and schools.

Washington Company Will Build \$250,000 Transmission Line

The building of a transmission line 110 miles long at an estimated cost of \$250,000 was announced by the Washington Water Power Company the first of the month; construction work to start as soon as the weather permits this spring. The new power line will extend into the Stratford, Ephrata and Moses Lake districts in Grant county, west of Spokane. Residents of Grant county have been conducting a vigorous campaign for the last four weeks to obtain sufficient subscribers for current to justify the extension. The purchase of 1200 horsepower annually has been agreed upon as the initial load required and this has been subscribed for. While this is not sufficient to return an adequate amount on the investment, the company is confident of the future of the district and willing to stand its share of the development cost.

The building of the power lines will make possible the irrigation by electric pumps of 25,000 acres of exceptionally fertile land. Considerable irrigation has already been done in Grant county by gasoline pumps which have secured water from wells fed by an underground stream. This has not proven satisfactory because of the cost which is said to have ranged from \$15 to \$50 an acre. It is estimated that the cost with electricity will be from \$3 to \$15 an acre.

The proposed 60,000-volt transmission line will connect with the present Big Bend line at Hartline and run southwest to Coulee City, thence directly south to Stratford where a 60,000-hp., 500-volt substation will be built. From Stratford the line will continue south to its terminal at Neppel where a 1000-hp. substation will be built. From Stratford a 13,000-volt distribution line will extend southwest along the Great Northern Railway to Adrian, the Grant Orchards, Soap Lake and Ephrata.

California Land Owners Fight For Water Rights

The question as to whether a landowner has exclusive rights to the water in a stream adjacent to his premises is being fought out in the superior court of Madera county, California, in a suit brought by the recently formed Madera Irrigation District against Miller and Lux and the Southern California Edison Company. The irrigation interests are seeking to restrain the power company and the Miller and Lux owners from constructing a dam across the San Joaquin River, which runs between the lands owned by Miller and Lux, alleging that such a dam would utilize water required for a \$28,000,000 irrigation project. This is the first case of its kind brought before the court to determine the riparian rights of an adjacent landowner.

Expenditures of \$1,371,450 have been recommended to Congress by army engineers for the improvement of Oakland harbor, an important section of the San Francisco bay. The improvements have been recommended in view of the industrial and commercial expansion of the city of Oakland. Most of the money will be spent for dredging.

Utah Has Immense Subterranean Water Supply, Report Shows

Approximately 2,000,000 acres of arid land in Utah are susceptible to irrigation through the development of the underground water resources of the state, according to a report which has been filed with Governor Mabey by a board which is charged with investigating the water resources for the United States Chamber of Commerce.

Of this total approximately 921,700 acres may be irrigated either by the utilization of underground or surface water. Over a million acres depend solely upon underground water for their development. The report suggests that suitable legislation be brought before the state legislature to make possible the organization of communities into districts for the development of such underground water resources. The report also suggests that surface water might best be used for the development of power, then for irrigation of the higher lands, while the power can be used in pumping plants for the irrigation of the lower lands from the underground resources.

California Manufacturers Ask For New Tariff Bill

Representatives of one hundred of the largest manufacturers in California, meeting in San Francisco recently, adopted resolutions calling for the immediate enactment of the Fordney tariff bill with the inclusion of the American valuation clause. The meeting resulted in the formation of the American Valuation Association of the Pacific Coast. At the meeting addresses were made by former Governor James M. Gillett, John R. Millar, vice-president and general manager of the California Cotton Mills and president of the California Manufacturers' Association, and F. D. Parsons, superintendent of the Judson Manufacturing Company.

Water Resources of California to be Investigated

Water resources of the state of California are to be investigated beginning early in the spring under the direction of engineers of the State Water Resources Committee, with a view of determining the possibilities of further power and irrigation developments. The Sacramento valley will comprise the first section to be surveyed and data will be secured regarding the re-routing of the tracks of the Southern Pacific Company so as to provide a site in the Sacramento river canyon for a large reservoir. The data is to be ready for the state legislature in 1923.

Official announcement has been made that the new Northern Commercial Company of Alaska will move its general headquarters from San Francisco to Seattle on March 1. Authority for this statement is given by Volney Richmond, president of the company. The Northern Commercial Company recently purchased the Alaska and Yukon business and trading posts of the famous old Northern Commercial Company of San Francisco, with the exception of the posts in Iditarod and Bettles. It is estimated the purchases in Seattle will approximate \$2,000,000 yearly.

California Power Company to Spend \$22,500,000

Southern California Edison Company's 1922 Budget Is Largest in History of Western Hydroelectric Development

The largest annual budget appropriation in the history of any western power company, which calls for the erection of a world's record long distance high tension transmission line, 240 miles long at 220,000 volts, has been announced by John B. Miller, president of the Southern California Edison Company of Los Angeles. The sum to be expended for additional water power development and extensions to transmission and distribution systems has been set at \$22,500,000 by the board of directors of the company.

The total expenditure will include \$10,951,000 for water power development; \$3,333,000 for 220,000-volt transmission lines; \$8,124,615 for improvements and extensions to distribution lines and substations; and \$125,385 for subsidiary companies.

For the purpose of comparison with other large community improvements, it is interesting to note that the expenditures of the Southern California Edison Company for this one year will approximately equal the cost of building the Los Angeles Aqueduct, which was \$23,000,000, the construction of which covered a period of six years. During the past eleven years the Los Angeles Bureau of Power and Light has constructed in connection with the Aqueduct an electric system valued at thirteen million two hundred and fifty thousand dollars.

In addition to its budget appropriation of \$22,500,000 for plant additions, the company will disburse during the year \$17,500,000 for operating expenses, wages, materials and supplies, interest and dividends, which will bring its total

expenditures to forty million dollars, or more than three million dollars per month.

Three thousand five hundred men will be employed directly on power plant construction out of a total of six thousand five hundred employees, who will be provided with profitable occupation for the support of themselves and their families as economic producing units in the territory covered by the company's activities.

This great expenditure of money during 1922 is the result of the continued rapid growth of southern and central California, which brings with it an increased demand for electric energy. About fifty per cent of the twenty-two million five hundred thousand dollars will be spent in the construction of new water power plants on the Big Creek and San Joaquin developments of the company. The other half will be expended on the transmission and distribution system covering the greater part of southern and central California.

Growth in the development of electric power is a very good index to general community expansion and prosperity. Based on ratios existing between electric business and other lines of activity in southern and central California, the expenditure of twenty-two million five hundred thousand dollars by the Southern California Edison Company in water power development and distribution of electric energy, will make possible approximately three hundred million dollars increase in community wealth, distributed into homes, mercantile and manufacturing establishments, improvements to farm lands, and extensions to railroads and highways.

Idaho Power Company Will Spend \$200,000 During Year

Approximately \$200,000 will be spent by the Idaho Power Company during the coming year for construction, according to an announcement made by the board of directors. The money will be used principally for the completion of the Mountain-Home-Featherville transmission line and the erection of a new substation in Boise.

Despite the fact that the closing down of many of the mines in the district served by the company and the decrease in power used for irrigation, reports show an increase in gross earnings and an increase in the number of consumers of 2602. Company officials report that requests have come from various mining companies for approximately 2500 horsepower during the past few weeks, indicating a revival of activity in the mining camps. The board also approved the appointment of Fred J. Rankin as chief engineer.

Under the auspices of the Colorado Manufacturers' Association, a monster industrial exposition, featuring Colorado-made goods, will be held in the Denver municipal auditorium from February 20-25. It is reported that Colorado electrical interests will take an active part in the exposition.

San Francisco Engineers Increase in Number in 10 Years

Electricians and electrical engineers in San Francisco increased from 2172 in 1910 to 2520 in 1920, according to figures which have just been issued by the Bureau of Census in Washington, D. C. The largest increase of members of the engineering profession was in the number of mechanical engineers, which grew from 200 in 1910 to 1017 in 1920. There was a decrease in stationary engineers of 266, leaving the number employed in 1920 at 2428. The number of machinists and toolmakers increased from 2982 to 6489 in the ten years, while managers and superintendents of manufacturing plants increased from 508 to 1366 in the same period.

Telephone extensions and improvements in San Francisco during 1922 will amount to \$2,750,000, according to an announcement made by J. C. Nowell, vice-president and general manager of the Pacific Telephone and Telegraph Company. These additions will be necessary to provide for the increase in subscribers, estimated by company officials to be more than 11,000. A total of \$750,000 of this sum will be used to improve long distance lines running from San Francisco.



The semi-annual convention of the Southern Idaho Association of Electrical Contractors and Dealers, a group picture of those in attendance being shown above, was held at the Bannock Hotel in Pocatello, late in January. Mrs. Leon Lery, the only woman member, owner and manager of the Main Electric Co. of Pocatello, is seated at the right of Harvey Ball, retiring president.

Semi-annual Convention of Idaho Contractor-Dealers

The semi-annual convention of the Southern Idaho Association of Electrical Contractors and Dealers, which was held at the Hotel Bannock, in Pocatello, was featured by the largest attendance ever accorded a meeting of this association. Under the leadership of Harvey Ball this association, which was organized only a year ago, has grown from an initial membership of twelve to forty-two. In addition all of the power companies, jobbers and manufacturers operating in this section are affiliated as associate members.

The following officers were elected for the ensuing year: George Pickup, Idaho Falls, president; C. T. Stephens, Po-

catello, secretary; L. C. Bullock, Weiser, vice-president; Ben J. Hetherington, Boise, vice-president; and Harry Dinklerlacker, Twin Falls, vice-president.

In addition to a banquet at which addresses were given on subjects pertaining to the betterment of the industry, the following addressed the gathering:

"Rocky Mountain Cooperative League," Bert Rowley, sales manager, Edison Electric Appliance Co., Salt Lake City; Frank Venable, assistant manager, Montana Electric Co., Butte, Mont.; "Electrical Engineering," Prof. H. T. Plumb, General Electric Co., Salt Lake City; "Fundamentals of Electrical Retail Merchandising," L. B. Johnson, General Electric Co., Salt Lake City; "Rocky Mountain Cooperative League Activities," Ralph Blake, sales manager, Utah Light and Power Co., Salt Lake City; C. C. Campbell, sales manager, Inter-Mountain Electric Co., Salt Lake City; A. J. Calloway, manager, Western Electric Co., Salt Lake City; E. E. Brazier, sales manager, Capital Electric Co., Salt Lake City.

General Goethals Surveys Columbia River Basin

Builder of Panama Canal Investigates Development Which Would Irrigate 1,775,000 Acres in Central Washington

General George W. Goethals, builder of the Panama Canal and one of the foremost engineers in the United States, is engaged at the present time in conducting a personal survey of the proposed Columbia River Basin irrigation and power project for the state of Washington, which contemplates the irrigation of 1,775,000 acres of arid land in the central part of the state.

Two plans have been suggested for this development and it will be his duty to decide upon both as to feasibility and cost. Preliminary surveys have already been made as the project has been under consideration for the last seven years. This data will be used in conjunction with the present survey.

One plan proposed for the project is known as the Pend Oreille gravity plan. By this plan it is proposed to carry water for 130 miles at the rate of 20,000 cubic feet a second. This plan involves the construction of the longest aqueduct tunnel known, 15½ miles in length.

The second plan calls for a dam and a pumping station. The dam would be constructed across the Columbia River at Grand Coulee and would be at least 120 feet high and 3000 feet long, three times the size of the present Assouan Dam across the Nile in Egypt. Power would be generated at this dam for pumping 18,000 cubic feet of water a second to a height of 420 feet, where it

would flow down a natural coulee to the area to be irrigated.

It is estimated that 990,000 horsepower would be required to pump this amount of water into the coulee. This amount could easily be generated, it is estimated, and amounts up to an addition of one million horsepower depending upon the height of the dam. Preliminary estimates of the sum to be expended have been set at \$170,000,000.

The project has already met with the approval of various powerful financial interests in the Northwest. Investment bankers of Seattle, Portland, Spokane and Tacoma passed resolutions favoring the project at a recent meeting of the Pacific Northwest Group of the Investment Bankers of America.

The Pacific Gas and Electric Company will sell power to the city of Redding, which recently purchased the company's distributing system, at wholesale rates as the result of a recent order by the California State Railroad Commission. Following the purchase the company offered power to the city at its re-sale rate, while the city held that it was entitled to the wholesale rate. Both appealed to the Railroad Commission. It is estimated that the city will save between 5 and 10 per cent on its total power bill as the result of the order.

Books and Bulletins

EMPLOYEE TRAINING

John Van Liew Morris, Ph.D.; McGraw-Hill Book Company, New York, 1921.

By G. VERNON BENNETT

Department of Vocational Education,
University of California

We have heard much recently about the passing of the apprenticeship system; but Dr. Morris shows in this valuable book that we still have its principles well applied in the vocational training department of such great corporations as the Westinghouse Electric Co., the General Electric Co., the Western Electric Company, and dozens of lesser industrial establishments. The layman will be interested to know that each of those companies is training hundreds of apprentices through three or four years and paying the boys well during the entire period.

Here are some of the high spots from "Employee Training": The General Electric Company at Schenectady offers the following courses free: apprentice training, with pay ranging from 20c. to 36c. per hour; engineer training in the testing department for college graduates with pay from \$24.75 to \$27.50 per week; foremanship courses; intensive upgrading training; Americanization, and instructor training. Features of the Western Electric's plant school are special training for high school graduates to become laboratory assistants; office boy instruction; apprenticeship for mechanical trades; and the International Western Electric course for college graduates to prepare them to represent the company abroad. The Ford Technical Institute, to be of university rank for theoretical and job training in mechanical, electrical and chemical engineering, is described. In preparing employees to become executives no company has equaled the Packard Motor Company, with its thorough two-year course. The importance of the subject of "Employee Training" may be seen from these two quotations:

Goodyear's factory manager said in an address to foremen on Nov. 1, 1919: "Today it is the industry which has the best men and trains its men best to run the machines efficiently, which wins. The keynote of success is men, not machines."

Speaking of the Norton Company's Worcester Employee School, Morris says: "It is claimed for the training department that it has produced a greater stability in the company's labor supply, a better type of workman, has reduced the number of accidents, and has provided a reservoir from which superior workmen can be chosen for foremen."

Dr. Morris' book is packed with the latest facts on employe training. The description of Goodyear's Flying Squadrons is worth many times the price of the book. In fact, no employment manager, educational director, or business man employing more than a score of men can afford to be without a copy.

Meetings of Interest to Western Men

Coast Jobbers Stage Successful Quarterly Session

The quarterly session of the Pacific Coast Electrical Supply Jobbers' Association, January 25 to 28, proved to be a banner meeting not only in the matter of attendance but also in the papers presented and a general better understanding prevails in the industry of the Coast as a result of the session. The gathering of data as to whether automobiles for jobber salesmen actually prove a saving is one of the technical problems that is being investigated by the association. The question of the business outlook for the coming year and the formulating of policies to best meet the situation was the subject of the open session on Saturday, the 28th.

Robert Sibley, editor of the Journal of Electricity and Western Industry, presented a paper on "Business Forecasting for 1922. Mr. Sibley showed that the present hydroelectric program in the West was exceeding even the best prophecies of a year ago as to the scope of the program involved, in that the present 1922 program calls for over \$100,000,000 new expenditure in development work of this type and a building program in the cities and country districts of the West totaling over \$400,000,000. In both these lines of activity the West has never before in its history achieved this mark. "Business activities," said Mr. Sibley, "in the hydroelectric and building lines are better this year by about 10 to 15 per cent compared with last year. It is believed that by December business conditions in the electrical industry will be better by 15 per cent over the previous year."

Eustace Cullinan, executive manager of the Greater California League, which is organized to defeat the proposed Water and Power Act to appear on the November ballot in California, made his initial appearance before the industry and presented a powerful plea for the defeat of the bill, in which he showed that industry generally and the commercial, banking and agricultural life of the state were at stake.

The golf banquet on Saturday evening, January 28th, had the largest attendance in the history of the association. Jobbers, manufacturers, agents, and central station men, representing

practically every district of the West, participated in the affair. Portland carried away practically all of the cups offered by the Jobbers' Association, with the exception of the Central Station Cup which was won by R. E. Fisher, the newly appointed vice-president of the Pacific Gas & Electric Co.

The Portland delegation that carried off the golfing honors was headed by Floyd Averill, general manager of the Fobes Supply Company and retiring chairman of the organization, O. B. Stubbs of the Stubbs Electric Company and George Boring, Portland manager of the Pacific States Electric Company. Charlie Hillis of the Electric Appliance Company, San Francisco, and H. E. Sanderson of the Bryant Electric Company both played from scratch in the tournament. They are the association's "open" champions.

Joint Meeting at Los Angeles of Jobbers and Contractor-Dealers

Jobbers and Contractor-Dealers of Los Angeles held a special get-together meeting in the assembly hall of the Southern California Edison Company, Thursday evening, Feb. 3rd. The meeting turned out to be a record-breaker with one hundred and forty-three present to listen to spirited talks for the good of the industry.

Secretary L. W. Davis, of the National Association of Contractors and Dealers, on his annual visit, delivered a message with the conviction of years of experience and contact with the work of the industry. He outlined the successes and failures of the industry and its individuals, laying particular stress on the point that right dealing is always straight ahead and success eventually attained.

Dave Pence, manager of the lamp department of the Illinois Electric Company, in a clever way pictured the present and future possibilities of real commercial lighting.

Glenn Arbogast brought home to the contractor-dealers the full significance of the work of the California Electrical Cooperative Campaign and forcibly told just where and to what extent the dealers profit by this activity and the value of their support in the work undertaken by the Campaign.

San Francisco Wins Attendance Contest by Small Margin

Resulting in attendance records never before achieved by organizations representing the electrical industry on the Pacific Coast, the three months' attendance contest in which the Los Angeles Electric Club and the San Francisco Electrical Development League participated closed on January 30 with San Francisco the winner by 114. During the period between November 7 and January 30 a total of 2678 persons attended the weekly luncheon meetings of the Los Angeles organization, while 2792 people visited the sessions of the San Francisco League. The records were made possible by the spirit of friendly competition which was brought into play and both organizations are being congratulated on the remarkable showings which were made.

Oregon Contractor-Dealers to Hold Convention

The Oregon Association of Electrical Contractors and Dealers will hold its first mid-winter convention at Corvallis, Oregon, March 2 and 3. J. H. Sroufe, state president of the association, has arranged to have this convention depart from the usual custom of the organization's conventions by opening all meetings to the public. The first day will be devoted to business meetings of the state executive committee and in the evening a banquet will be held for the entire membership of the association. In the morning of the second day a golf tournament will be held at which those interested in golf will compete for the handsome golf cup donated by the Portland jobbers. Following the golf tournament a base ball game between the contractor-dealers and the jobbers will be staged in the indoor field of the Oregon Agricultural College. In the afternoon the first public meeting will be held in the woman's gymnasium of the college. This session will be devoted to the presentation of papers dealing with hydroelectric development in the Northwest, convenience outlets and better illumination for residences, and other subjects interesting to those engaged in the electrical development of the Northwest. The evening will be devoted to an elaborate demonstration of proper illumination and lighting effects by F. H. Murphy, illuminating engineer of the Portland Railway Light and Power Company. The woman's gymnasium of the college will be used for this purpose and the stage will be divided into two rooms which will each have two settings to show the four principal rooms in a house. This demonstration is the feature of the convention and will be staged on a scale never before attempted in this section.

F. R. Whittlesey, secretary of the association, has arranged with the officers of the Oregon Agricultural College to have the convention tie-in with the annual Engineering Exhibit of the College which was attended last year by over 5000 people, and it is planned to make the combined event a very important occasion which will attract a large attendance.

It is planned to make this mid-winter convention a regular event each year and to hold the annual election of state officers at this time.

COMING EVENTS

MONTANA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Annual Convention—Butte—March 6-7, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

ADVISORY COMMITTEE, CALIFORNIA ELECTRICAL COOPERATIVE CAMPAIGN

Palace Hotel—San Francisco—February 24, 1922

J. J. Agutter, head of the electrical engineering and contracting company of that name in Seattle, has been elected president of the recently organized Seattle Electrical Association. Mr. Agutter has been identified with the electrical industry in Seattle since 1904, when he organized the Agutter-Reardon Company. He has been assisting in Seattle's progress for twenty-two years, having served in the Inside Construction Department of the Puget Sound Traction, Light and Power Com-



J. J. AGUTTER

pany for twelve years previous to his entering the contracting field. Four years of this time was spent as superintendent of inside construction. The electrical industry of the West welcomes the news of the formation of the Seattle Electrical Association, which signifies the success of the "Electric Club" idea, and is confident that under the able leadership of Mr. Agutter the Seattle group will develop into an active force in the community.

Robert W. Larson, Portland contractor-dealer, has been elected president of the Portland Builders' Exchange to serve for the ensuing year. His election is in line with the interest which is being manifested by the electrical industry in Portland's 1922 building program.

E. L. Knight and J. C. English, prominent Portland contractor-dealers, were in attendance at the recent fixture dealers' convention and show in Milwaukee.

John A. Britton, vice-president and general manager of the Pacific Gas & Electric Company, the noted dean of the electrical industry in the West, has been confined to his home due to sickness during the past several weeks. No serious outcome is expected, but men of the industry generally are pleased to learn of his recent return to activity in his office.

E. D. Kilburn, vice-president and general manager of the Westinghouse Electric International Company, is a recent San Francisco visitor. Mr. Kilburn is en route to China, having sailed on the steamer Shinyo Maru. Before leaving for the Orient he expressed optimism over the prospects for American exports of electric equipment for 1922. He declared that European, especially German, competition, in the electrical field need not be feared by the American manufacturer as this country leads the world in the quality of many lines of electrical material.

Personals

C. S. Beardsley, sales director of the Apex Electrical Distributing Company of Cleveland, is making a tour of various Pacific Coast cities, where he is aiding in the establishment of sales promotion offices for the lines manufactured by the company which he represents. J. B. Fullerton, western district manager, whose offices are in Los Angeles, was in San Francisco with Mr. Beardsley recently, aiding in the establishment of such an office for northern California.

W. F. Brainerd, formerly field representative for the California Electrical Cooperative Campaign and later with the Valley Electrical Supply Co. of Fresno, has been made Canadian manager of the California Associated Raisin Co. and will take up his headquarters in Ontario, Canada, at an early date.

H. E. White, engineer for the General Electric Co., arrived in San Francisco recently on the steamer Wolverine State, from Calcutta, India.

George Kidd, general manager of the British Columbia Electric Railway Company, Ltd., Vancouver, has left for England where he will attend the annual stockholders' and directors' meeting in London. Mr. Kidd will spend a short time in Ottawa in connection with the Vancouver central station's application to be placed under the control of the Dominion Railway Board.

R. D. Williams, for more than twenty years connected with the traffic department of the Erie Railroad, has been named traffic manager of the Sacramento Northern Railroad, in charge of both the freight and passenger departments of this electric line. During the war Mr. Williams was charged with the organization of a traffic department for the housing division of the Emergency Fleet Corporation.

Dean G. M. Butler, head of the engineering department of the University of Arizona, was the principal speaker and guest of the Los Angeles section of the American Association of Engineers at the January meeting of the organization.

Lawrence W. Davis, special representative of the National Association of Electrical Contractors and Dealers, is making a three months' study of western merchandising problems. Mr. Davis recently addressed the convention of the Pacific Coast Division of the National Electrical Supply Jobbers' Association at Del Monte and later is expected to make extended visits at Los Angeles, San Francisco, Portland, Seattle and other western commercial centers.

G. E. Quinan, chief engineer of the Puget Sound Power and Light Company, Seattle, has been indorsed as a candidate for the office of vice-president representing the Northwest district of the American Institute of Electrical Engineers, by the Portland and Seattle sections of the organization.

H. A. Joslin, manager of the Mountain States Power Company at Dallas, Oregon, has been elected a director of the Dallas Commercial Club for the fourth consecutive term.

Frank LeSage, manager of the National Electric Company of Butte, Montana, is spending six months in the East, where he attended the fixtures exposition and lighting dealers' convention in Milwaukee. He is also inspecting several of the large fixture manufacturing plants, including the Cleveland factory of the General Electric Company.

R. B. Walls, of the Peninsula Electric Company of Portland, has been elected chairman of the first district, Oregon Association of Electrical Contractors and Dealers, to succeed A. E. McCov.

Harley W. Brundige of Los Angeles has been re-elected president of the California State Railroad Commission for the year 1922.

R. M. Boykin, vice-president and general manager of the North Coast Power Company, with headquarters at Portland, has left for an extended business trip to the East.

E. M. Daugherty, Los Angeles contractor, has been named to succeed E. C. Bellows as State Commissioner of Corporations by Governor William D. Stephens of California. Mr. Daugherty has been engaged in the contracting business in the southern part of the state for the past eighteen years and his appointment is considered a reward for his active participation in public life. Previous to entering the contracting business he studied law.

Harry L. Harper, manager of the Los Angeles branch of the Western Electric Company, who has been active as chairman of the southern section of the Convenience Outlet Committee of the California Electrical Cooperative Campaign, is rounding out his term as first president of the Electric Club in Los Angeles. The Electric Club since its organization a year ago has been one of the most effective agencies in the promotion of the electrical idea in the entire West. With enthusiasm characteristic of the southern metropolis it



H. L. HARPER

has developed a large and active membership and except for the unfortunate fact that a pouring rain interfered with its program on the deciding day might have won a cup offered for the state championship in attendance. The success for the Electric Club is in a large measure due to the capable leadership of Mr. Harper, who was active in its formation and who has always taken a prominent part in all of its activities.

K. E. Van Kuran, Los Angeles manager of the Westinghouse Electric and Manufacturing Company, has returned from an interesting and extensive business trip to eastern centers.

A. B. West, president of the Pacific Coast Electrical Association, Samuel H. Taylor, secretary of the Association, together with Harry Bostwick, L. H. Newbert and Robert Sibley, members of the executive committee, met at Del Monte during the past semi-monthly period to fix the date for the forthcoming convention which is to be held in Los Angeles at the Hotel Ambassador on May 31, June 1 and June 2.

George N. Rooker, manager of the Richmond division of the Western States Gas and Electric Company, has been appointed to membership on the City Planning Commission of Richmond, California.

Wigginton E. Creed, president of the Pacific Gas & Electric Company, is expected to return from the East within a few days, where he has been visiting for some weeks in the interests of his company in matters relating to finance.

Harry Turner, manager of the Montana Electric Company and the Washington Electric Supply Company, is now spending the winter at Carmel-by-the-Sea, and together with H. A. Bargion, his local manager, was in attendance at the Del Monte convention of the Pacific Coast Electrical Supply Jobbers' Association.

George E. Lewis, who is well known in the Intermountain region as an authority on public relations of utilities, has been appointed executive manager of the newly formed Rocky Mountain Committee on Public Utility Information. The personnel of the committee is recruited from the states of Colorado, New Mexico and Wyoming, which territory it serves. The committee headquarters are located in the Gas and Electric Building in Denver. Executive Manager Lewis established an enviable



G. E. LEWIS

record during the war period when, as Director of Publicity for the Mountain Division of the American Red Cross, he did much toward standardizing that organization's publications and furthering its financial and other campaigns. He has had several years of executive experience in his profession and has been a feature writer. He has made a special study of utilities with respect to public relations.

F. M. Feiker, vice-president of the McGraw-Hill Publishing Company, who for the past eight months has been assisting Secretary of Commerce Herbert Hoover in the reorganization of the department, has resigned to return to his former duties. Mr. Feiker has not, however, completely severed his relations with the Secretary or the Department. He has been appointed a special agent of the Bureau of Foreign and Domestic Commerce, to continue in a consulting capacity the work he has been rendering. Last May Mr. Feiker was given leave of absence from the McGraw-Hill Company to join the Department of Commerce as a special administrative assistant of Secretary Hoover. He was selected because of his very wide knowledge of and experience and acquaintance in the American industrial field. During Mr. Feiker's stay with the department, "Commerce Reports," the government's official foreign trade paper, has been changed from a daily to a weekly publication and its style and appearance completely altered to more nearly meet the needs of business. The "Survey of Current Business," a new publication destined to be of much assistance to American business men, was also brought into existence.

J. H. Anderton of the firm of Thebo, Starr and Anderton, consulting engineers of San Francisco, sailed for Japan and the Orient on February 7 on the steamer "Empire State." Mr. Anderton will inspect the various hydroelectric projects which his firm is supervising and building for various Japanese power companies.

James R. Kearney, formerly sales manager of the electrical division of W. N. Matthews & Brother, Inc., St. Louis, has been made vice-president in charge of sales of that division. He has been associated with the company for seventeen years. Before becoming associated with them he was superintendent of construction for the Topeka Edison Company.

G. E. Emmons, vice-president in charge of manufacture for the General Electric Company, spent the month of January in Pasadena. During his visit to the West he remarked upon the rapid development of hydroelectric power and the freedom from retarding industrial and commercial conditions which was so evident in the East during the recent depression.

Heman Greenwood, Brazilian representative for the Pelton Water Wheel Company of San Francisco and New York, is in San Francisco on a business trip to the company's factory. According to Mr. Greenwood, elaborate preparations are being made at Rio de Janeiro for the exposition which is to be held there in the fall of this year. It will be remembered that Mr. Greenwood was a member of the class of 1917 of the University of California.

J. I. Colwell, Seattle manager of the Western Electric Company, Phil Aaron, Seattle manager of the Fobes Supply Company, Roy Worth, Seattle manager of the Pacific States Electric Company, and Harry Byrne of the North Coast Electric Supply Company, were those in attendance from Seattle at the recent Del Monte gathering of the Pacific Division of the National Electric Supply Jobbers' Association.

Clotilde Grunsky, associate editor of the Journal of Electricity and Western Industry, has been elected president of the Business and Professional Woman's Club of San Francisco. Miss Grunsky for the past five years has occupied the position on the staff of the Journal of Electricity as associate editor and has become recognized nationally as perhaps the best woman writer on technical subjects pertinent to the electrical industry and other industries in the



CLOTILDE GRUNSKY

West. She is one of the three women members of the American Institute of Electrical Engineers, chairman of the Woman's Public Relations Committee of the Pacific Coast Electrical Association, and also a member of the Woman's Public Relations Committee of the National Electric Light Association. The Business and Professional Woman's Club of San Francisco is one of the powerful organizations of the West which today is forwarding the ideals of business in the upbuilding of this section of our nation, and the Journal of Electricity and Western Industry is glad through Miss Grunsky to have a part in this work.

H. R. Stevens, former engineer engaged in hydroelectric construction for the San Joaquin Light and Power Corporation, has recently sailed for Japan where he will act as superintendent for Thebo, Starr and Anderton, San Francisco consulting engineers on the hydroelectric project they are building for the Daido Electric Power Company at Nagaya.

E. O. Shreve is chairman of the nominating committee appointed to name the incoming officers of the San Francisco Electrical Development League. Serving with him on the committee are Garnett Young, Henry Bostwick, Robert Sibley and R. E. Fisher.

H. D. Miller has been appointed manager of the new business department of the Western States Gas and Electric Company, Stockton, Cal. Mr. Miller has been with the company for some time in various capacities.

Dr. R. A. Millikan, director of the Norman Bridge Laboratory and executive chairman of the California Institute of Technology, has been selected as the first exchange professor to Belgium under the C. B. R. Educational Foundation. Dr. Millikan will not leave Pasadena until May.

N. G. Harvey, of the Illinois Electric Company, Chicago, spent several weeks in Los Angeles playing golf and otherwise entertaining himself. In exchange for the privilege of enjoying Southern California sunshine C. B. Hall introduced him to several gatherings of the electrical fraternity. His remarks and comments on the business outlook for 1922 were both instructive and humorous.

Paul F. Johnson, Pasadena, has opened an exclusive radio store on Los Robles street opposite the Hotel Maryland. With years of experience in radio research and development Mr. Johnson has reason to anticipate much business in his district, particularly among the better class receiving sets. He carries a full line of Kennedy, Remler, and Chicago Radio equipment.

Broadcasting radio concerts every evening in the vicinity of Los Angeles is believed to be largely responsible for the sudden activity in the sales of radio-phone receiving sets. According to the Electric Lighting Supply Company the sales range from twenty-dollar utility outfits to the long range four-hundred-dollar sets indulged in by amateurs in the exclusive residence sections.

Smith Electric Company of Glendale has moved into the store previously occupied by the J. A. Newton Electric Company at 631 East Broadway. They are specializing on Universal appliances and Westinghouse lamps in addition to the fixture and wiring business formerly conducted.

W. S. Maitland and George J. Paris have opened a new contractor-dealer establishment at Castle Rock, Colo., under the firm name of Maitland & Paris.

The Robbins and Myers Company, Springfield, Ohio, has recently perfected a new line of radio generators and motor generator sets for service with wireless telephone outfits. The generators are made in 500 and 1000-volt types in capacities of 100, 200 and 500 watts.

The Western Machinery Company is displaying at its San Francisco offices and salesrooms, 44 Natoma Street, a new 100-hp. Western full Diesel engine. In addition to other novel phases in its construction, the engine is equipped with a new type of fuel injector.

Special hand wrought lighting standards made entirely of lead, or being made by J. W. Hancock, a Denver electrician.

The Commercial Switch Board Manufacturing Company of Denver has completed the installation of its electric welding equipment.

Report of sales for January by the American Ironing Machine Company shows Denver territory second in the whole country due to the efforts of F. X. Marzolf, sales representative there.

The Smith-McCoy Electric Company of Portland will move to new quarters soon. The new location has not been announced.

The Mine and Smelter Supply Company of Denver has taken the Automatic Electric Heater account and will feature the Sepco line of water heaters.

The J. C. English Company, of Portland, will give up its handsomely appointed retail electrical store established about a year ago and go into the exclusive fixture business.

Manufacturer, Dealer, and Jobber Activities

The Apex Electrical Distributing Company has established a sales promotion department for its northern California territory, in conjunction with the Electric Railway and Manufacturers' Supply Company, its representatives in this district. B. A. Butterfield, assistant district manager for the Apex products in the western territory, will have direct charge of the sales promotion office, working under the supervision of J. B. Fullerton, western district manager, whose offices are in Los Angeles. The San Francisco sales promotion department will be located at 607 Santa Fe Building.

The Automatic Electric Heater Company, Warren, Pa., has issued a circular describing the advantages of a new automatic electric glue pot recently perfected by that company.

The Trumbull Electric Manufacturing Company, Plainville, Conn., has issued circular No. 52, describing its new Snuff-are switches for 600-volt lines. The switch is the same size as the 500-volt type manufactured by this company.

Bertram Smith, for many years associated with the Edison Storage Battery Company, is introducing the products of the Automatic Electrical Devices Company throughout the West. This company specializes on small battery charging units for shop and home use. Western offices have been established in the San Fernando Bldg., Los Angeles.

Through an error in the list of manufacturers and western distributors published in the February first issue of the Journal of Electricity and Western Industry, it was made to appear that the Garland-Affolter Company, with headquarters in San Francisco, had relinquished its Seattle office. No change in personnel or lines represented has been made by this organization, H. H. Thedinga remaining in charge in Seattle as branch office manager.

J. C. Hobrecht of the J. C. Hobrecht Electrical Company, Sacramento, is receiving congratulations for the excellent radio broadcasting station which he has recently installed for the Sacramento Bee, in conjunction with a program of broadcasting news and weather reports throughout the agricultural district in the northern section of California.

The Empire Transformer Company, Chicago, has moved into new quarters at 2000 Southport Avenue, as the result of the purchase of the manufacturing rights and equipment of the Elektro line of merchandise. The company has also purchased the rights on the D. C. Hughes electric toys including an electrically operated toy steam engine. The company also announces that it has developed the Empire six-pound flat iron which is ready for distribution. William Sickinger is vice-president of the company.

The Esterline-Angus Company, Indianapolis, manufacturers of electrical instruments, has issued Bulletin No. 122, describing actual instances where savings have been made in industrial plants through tests made with a graphic meter.



THE LITTLE STRANGER COMES WEST AGAIN

"The little stranger," J. J. G., manager of the supply department of one of the biggest electrical manufacturers, the one located at East Pittsburg, Pa., is paying another highly successful visit to the West as evidenced by his genial spirits at the recent jobbers' convention at Del Monte. The group looking out of the door of this automatic hydroelectric station of the San Joaquin Light and Power Corporation read from left to right something like this: "The little stranger"; A. W. Childs, chairman of the advisory committee of the California Electrical Cooperative Campaign, and superintendent of sales of the Southern California Edison Company; Marshall Scobey, San Francisco dealer; Glenn Arbogast, Los Angeles, ditto; A. E. Wishon, general manager of the San Joaquin Light and Power Corporation; R. M. Alvord, manager of the supply division, San Francisco office of the General Electric Company, and C. D. LaMoree, Los Angeles manufacturers' representative. Indeed, a well known crowd of "victims."

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Business in all lines of manufacture continues quiet. Wholesalers of dry goods and kindred lines report a fairly active demand in medium-priced merchandise at stable prices. Manufacturers and retailers of women's wearing apparel and shoes report only a fair volume of trade. Building material and lumber dealers are doing a slightly increased business and are optimistic for future developments. Automotive sales are slow, but dealers expect business to increase steadily. Considerable interest is being shown in the forthcoming auto show. The accessory line continues quiet. There is not much activity in the furniture trade. Flour and grain dealers report a good domestic business, while export demand is small. Collections continue slow. Building permits for January totaled 620, amounting to \$5,528,510.

LOS ANGELES

The last two weeks in January witnessed a sudden increase in volume of business. Bank clearings finished the month with a total of \$410,191,187 or 12 per cent ahead of 1921.

Building permits for January numbered 3,416 and amounted to \$7,975,168 or more than double the same month of last year. Dwellings still maintain the unusual position of one-half of the total in estimated value.

Imports and exports dropped more than a million dollars for the month. The recent cold weather is reported to have injured the citrus crops to a considerable extent. Arizona cotton growers report that out of a total crop of 30,000 bales, 10,000 bales have been assigned to the Arizona Pima Growers Association, in the first attempt at co-operative marketing. A thousand bales of cotton have been sold at 33½c. a pound.

Continuation of rains and unsettled weather is cutting a big hole in the retail sales for the month of February. Wholesale trade is reported to be far ahead of the same period in 1921 and collections are much improved.

PORTLAND

Business for the most part was quiet during January. Heavy price reductions stimulated retail buying somewhat. One of the most encouraging features of the new year is the continued improvement in the lumber industry, which is so important locally. Production ranges from 15 to 20 per cent below normal, with new business and shipments equaling and some weeks exceeding production. Heavy buying to fill the badly depleted stocks of eastern

lumber jobbers and large orders from the railroads are looked for in the early spring. A very active year in building construction is looked for, since 875 building permits totaling \$1,147,960 were issued during January, an increase of half a million dollars over permits issued for January, 1921. Electrical retail sales in common with other lines have been slow, on the other hand contracting business is fair and is improving as building construction increases.

SALT LAKE CITY

Steady improvement is noted in the financial and credit situation as compared with the same period of last year, and there are distinct signs that with the coming of spring, business conditions will show a decidedly better tone. Banks report little demand for money at present, but many inquiries are being made in regard to loans to enable borrowers to build homes in the spring. A consolidated statement of 100 state banks and trust companies in Utah has just been completed, showing total resources on Dec. 31, 1921, of \$88,145,590.83 as compared with \$85,366,196.76 in June, 1921, indicating an improvement during the past six months.

The re-opening of the copper mines of Bingham and the activities of the war finance corporation, which has within the past thirty days approved more than a half million dollars in livestock loans, have improved the general outlook.

Electrical jobbers and contractor-dealers are looking forward to a considerable improvement in business when spring opens, and much building activity is anticipated. In general business is reported as fair by lumber and hardware dealers, with collections rather slow.

DENVER

As anticipated before the holidays, business in nearly every line has commenced the year conservatively and with less voluntary buying by the public than usual. Reports for January in most cases reflect the general conditions prevailing in this region. Very few failures have been reported, however, and the bank clearings do not show a marked falling off. New building operations are continuing and local manufacturers are not depressed. Two hundred and sixty-five building permits were issued during January amounting to \$507,150. If adjustments can be made to protect the beet sugar industry and if the apparent come-back of the metal mining industry materializes, it is believed that much good business will develop within the next sixty days. Erratic competition is eliminating profits from many jobs of electrical wiring and small appliance sales are exceed-

ingly dull. All jobbers report buying at minimum. Some laundry equipment is being sold. Most electrical men feel that their businesses will show improved activity by March 1st.

SPOKANE

Farmers hope for a bountiful 1922 crop for there has been a plentiful fall of snow and no warm weather to cause it to melt. "Old timers" in the county point to the similarity of weather conditions in 1913 when that district raised its largest crop per acre.

Real estate men report some business and a flood of inquiries. Spokane architects report that they have a large number of inquiries about residence building and that they are working on a number of business structures. The consensus of opinion among them is that there will be a large volume of building later this season.

Electrical jobbers in general are optimistic. A pole line is being built into the Wenatchee valley from Snoqualmie Falls. This will furnish an abundance of power for years to come, something that has always been lacking. This will lead to the construction of a number of feeder lines in the valley and the consequent sale of electrical apparatus and household appliances, preceded by a great deal of wiring work. A number of farm districts which have been without electric service are planning pole line extensions which is going to help the electrical jobbing business. Altogether, the outlook and feeling is better than it has been in 12 to 18 months.

SEATTLE

Building permits issued in Seattle during the month of January, which amounted to \$1,806,200, exceeded in valuation the permits issued in January, 1921, by 100 per cent. Bank clearings exceeded the January totals of last year and the real estate movement practically totaled the activity of the same months last year.

Reports of fruit canneries to the Washington Manufacturers' Association show that more than a dozen of the canneries, five of which are large plants, have cleaned up the last of the 1920 pack, which was carried over to 1921, as well as the pack of 1921. An increase is reported in lumber sales and a tremendous increase in shipments, as compared with previous weeks. Production was well sustained, being 70,643,849 feet, which was higher than that for any week in 1921, and second only to production for the previous week, which was 75,430,563 feet. Retail trade has held up well during the month, due largely to the number of stock-reducing sales and a general reduction in all lines of merchandise.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC CENTRAL DISTRICT

SANGER, CAL.—The Chamber of Commerce has announced a program for the coming year, including sewer, fire-fighting and municipal building improvements amounting to \$90,000.

MODESTO, CAL.—A 2-story office and store building will be erected at the corner of 11th and I streets, according to the plans of L. C. Black. The building is to be reinforced concrete and will cost approximately \$100,000.

PALO ALTO, CAL.—The Palo Alto Theater Co. is planning the erection of a \$140,000 theater, arranged for moving pictures, vaudeville and road shows, according to a recent announcement. The building will be located on University Avenue.

GRASS VALLEY, CAL.—Improvements contemplated at the South Star Mine, in the Deadman's Flat district, call for a modern hoisting plant, compressors and power drills, also a suitable group of buildings. A. Johnson of San Francisco is at the head of the development project.

SAN FRANCISCO, CAL.—The San Francisco Plastering and Lathing Company has been organized by the following contractors: P. J. Walker & Co., Dinwiddie Construction Co., Lindgren Co., Geo. Wagner, and MacDonald and Kahn. The new company will build its own plant where it will manufacture plaster and mortar.

FRESNO, CAL.—I. Teilman of this city and J. D. Galloway of San Francisco are the consulting engineers retained by the Mendota Irrigation District to prepare plans for the complete distribution system comprising some 70,000 acres. If the plans are to be carried through it will be necessary to vote \$2,800,000 in bonds to cover the cost.

MERCED, CAL.—The Crocker-Huffman Land & Water Co.'s irrigation system in Merced county has been sold to the Merced irrigation district for \$2,252,000. About 400 miles of canals and other property used in the system were included, but not the company's large land interests. Development plans of the district call for a 320-ft. dam at Exchequer, Mariposa county.

SAN FRANCISCO, CAL.—The Railroad Commission of California has authorized a bond sale of \$1,000,000 by the California-Oregon Power Co. to finance the construction of a transmission line to supply with electrical energy the Mountain State Power Company, of Eugene, Ore. The line will be about 115 miles long and will cost about \$750,000. Rights of way and other additions to the company's system will require an estimated expenditure of \$250,000.

DAVIS, CAL.—With the \$195,000 appropriation from the Board of Regents of the University of California and additional funds from the last legislature, a dairy industry building will be constructed at the University of California farm at Davis. The building will consist of a two-story main structure of hollow tile. The first floor will include laboratory for butter and market milk, commercial testing, student testing, farm dairy and bacteriology, and a sales room, offices and student locker room. The second floor will be occupied by three lecture rooms, seminar, reading and dairy products, judging

rooms, and office and storage space. The manufacturing wing will house the large creamery laboratory which will be used for practice work in butter, cheese, ice cream, market milk and milk condensing.

THE PACIFIC NORTHWEST

SEATTLE, WASH.—King county will spend \$701,500 on highway construction, repair and maintenance during 1922, according to announcement of Engineer Beeman. Of this amount \$403,000 will be for new construction.

ALBANY, ORE.—It is reported that the Mountain States Power Co., with headquarters at Albany, is negotiating with the Cottage Grove Electric Company for the purchase of the latter's plant at Cottage Grove with a view to enlarging and modernizing it.

PORTLAND, ORE.—A mass meeting was recently held here to consider the erection of a cold storage plant to handle fruits and vegetables awaiting rail shipment. The proposed building would be erected near the depot and would cost between \$50,000 and \$75,000.

PORTLAND, ORE.—The Wonder Electric Mfg. Co. was recently incorporated with a capital stock of \$25,000. The company will manufacture and deal in electrical appliances of all kinds. Application for incorporation was filed by John W. Henry, Chamber of Commerce Building, Portland.

SEATTLE, WASH.—Smith, Robinson & Co., electrical engineers, Vancouver, B. C., have been awarded contract for supplying and installing a 1,000-kw. generator and other electrical equipment which will complete the electrification of the Thurston & Flavelle sawmill at Port Moody. Contract totals \$60,000.

SALEM, ORE.—Carl H. Jackson, J. Fred Jackson and William B. Layton have incorporated with a capital stock of \$100,000. The firm will manufacture and deal in storage batteries, electrical appliances and supplies. William B. Layton, 640 Pittcock Block, Portland, filed the articles of incorporation.

HOQUIAM, WASH.—Announcement of the purchase of a tract of 12 lots by the First National Bank, acting for the Union Oil Co. of California, closes definitely the deal for the erection and maintenance here of a distributing depot by the oil company. The expenditure will total about \$200,000. Work is to start at once.

SEATTLE, WASH.—Commissioners of Grant county, Ephrata, Wash., have granted a franchise to the Washington Water Power Company to erect power lines on county roads. This is the first step toward installation of a proposed series of power lines by which extensive pumping operations will be installed for irrigating.

PORTLAND, ORE.—Portland's \$2,000,000 freight terminal to be constructed on Guild's Lake for use of all the railroads doing business in this city, is under way and will be rushed to completion as quickly as contracts can be let and filled, according to a statement made recently by Arthur C. Spencer, chief counsel for the O. W. R. & N. Co.

SALEM, ORE.—Plans for the proposed new state training school for boys have recently been completed by W. C. Knighton, Portland architect. It is said that work will start early in the spring. The plant will cost approximately

\$280,000 and will be constructed on the cottage plan. Money for the buildings was appropriated by the legislature at the 1921 session.

ASTORIA, ORE.—Lars Bergsvik, engineer for the Astoria water department, expects to have estimates of cost on the construction of the proposed new main conduit ready at an early date. The conduit is to be 11½ miles long, extending from the headworks on Bear Creek to the storage reservoirs of the city. The cost will probably be in the neighborhood of \$350,000.

TACOMA, WASH.—The Tacoma Ice & Refrigerator Co. is contemplating the erection here of a \$250,000 cold storage and ice-making plant at South 26th and Holgate streets. The cold storage capacity will be 400,000 cu. ft.; the ice output each 24 hours will be 100 tons. Construction of the refrigerating plant will require 200,000 lineal feet, nearly 40 miles, of 1¼-in. piping.

PORTLAND, ORE.—The Portland Telegram has taken a 25-year lease on a three-story brick building to be erected at 11th and Washington streets by J. N. Barde, at a cost of \$300,000. Plans are being prepared by Rasmussen, Grace & Co. The one-story brick building now on the property will be wrecked immediately so that construction on the new building will start early in the year.

BAKER CITY, ORE.—A permit has been granted by the state engineer, it is reported, for the use of waters from Cracker and Little Cracker creeks in the Bourne mining district for the development of 852 hp. The permit is issued to the Bourne Gold Mining Company and the power will be used in the operation of the E. & W. Mine at Bourne. Operations at the mine are being expanded as rapidly as machinery to handle increased tonnage can be installed.

EVERETT, WASH.—The General Hospital Association of Everett, of which P. J. Jordan, president of the Everett Pulp & Paper Co. is the head, has announced that \$150,000 has been raised in a drive for funds to construct a new hospital building on a site yet to be selected. Plans will be drawn by Stevens & Lee, of Boston, specialists in hospital and institutional design, who will be represented here by Bebb & Gould, architects of Seattle. Building operations will start in the near future.

EUGENE, ORE.—The Monroe Shingle Company's mill at Betzen, on the Coos Bay branch of the Southern Pacific which was destroyed by fire November 19, will be rebuilt at once, according to announcement by A. H. Buck, manager of the company. The new mill will be more modern than the old one in that it will be electrically driven throughout. The company will install an electric plant and each machine will have an individual motor. The capacity will be between 150,000 and 200,000 shingles a day.

OLYMPIA, WASH.—Contract to construct the foundation and first floor walls of the main building in the capitol group will be awarded March 13, all bids to be in March 11th, the capitol committee decided. Work will be pushed to finish the contract by Jan. 2, 1923, when the legislature will meet, so that further plans can be approved. The contract will also include construction of a terrace in front of the building, under which will be a large parking space for automobiles. It is estimated that the cost will approximate \$400,000. Alternative bids will

be requested for facing the structure with granite or stone.

PORTLAND, ORE.—The contract for the erection of the proposed auto storage building of the Imperial Investment Company at the southeast corner of Fourth and Pine streets, opposite the Multnomah Hotel, was let last week to A. Guthrie & Co. The construction will be started immediately, it was announced. Plans for the structure have been prepared by Sutton & Whitney and provide for a five-story fireproof building, 100 by 100 ft. in ground-floor area. The building will cost \$90,000. Sutton & Whitney also have prepared plans for a one-story concrete garage, to be erected for the Union Laundry Company immediately south of the present laundry building at 301 Second street. The structure will cover a ground-floor space of 50 by 100 ft. and will be used as a delivery room as well as garage.

THE PACIFIC SOUTHWEST

HOLLYWOOD, CAL.—Dodd & Richards, architects, are preparing plans for the Hollywood branch library which will cost \$500,000.

LONG BEACH, CAL.—The Western Savings Bank has purchased a site for a new banking house on which construction will start in about 60 days. The cost is estimated at \$100,000.

DINUBA, CAL.—The First National Bank of Dinuba has authorized the expenditure of \$150,000 for a new 4-story office and bank building. The bank will occupy the first floor and basement.

SAN DIEGO, CAL.—\$300,000 will be expended on a new high school group at Balboa Park. Architect Theo. C. Kistner as the representative of the Board of Education is in charge of the project.

BEAUMONT, CAL.—Messrs. Way & Delaney have purchased a site on the south side of the S. P. railroad, near the Standard Oil plant, for the erection of an evaporating and by-products factory.

SAN BERNARDINO, CAL.—The Santa Fe Railway Co. is taking bids for extensive improvements at the shops. \$300,000 will be expended in a steel and brick building, with traveling crane on 800-ft. runway.

LOS ANGELES, CAL.—Plans are being prepared by Carlton Winslow, architect, for a new church building for the Vermont Square Methodist Church. The building will be of hollow tile, and concrete construction.

CALIENTE, NEV.—The Salt Lake branch of the Union Pacific Railroad will erect a new depot and hotel building. The architecture is to be after the Mission style and will cost \$100,000, exclusive of equipment.

LOS ANGELES, CAL.—The Westinghouse Electric & Manufacturing Co. will erect a Class A, reinforced concrete factory building near 5th and San Pedro streets, to cost \$500,000. Noerenberg & Johnson are the architects.

SAN DIEGO, CAL.—The Bureau of Yards and Docks is calling for bids on the new refrigeration and cold storage plant to be constructed here. Plans are ready and the bids will probably be awarded early in February.

GLENDALE, CAL.—The Pacific Reliance Motor Corporation will erect a factory on San Fernando Road about one mile from the Moreland plant, according to announcement by G. S. Cutler, Eugene Kendall and Dr. Ben H. Smith.

RIVERBANK, CAL.—The Santa Fe Railway Co. awarded the contract for its new ice plant to Hayes-Oser Company of San Francisco. The general contract provides for buildings, icing platforms, installation of machinery and cooling tower.

SAN PEDRO, CAL.—The Bethlehem Shipbuilding Company has filed application with the local authorities of the U. S. Government for permission to dredge the slip at the old South-

west Shipbuilding Yard so as to accommodate a 12,000-ton drydock.

LOS ANGELES, CAL.—A 2-story addition to the cold storage and refrigeration plant of the Christopher Ice Cream Company is to be constructed under the supervision of Architect Richard D. King. The building will cost \$20,000 exclusive of equipment.

ALHAMBRA, CAL.—The Just Shoe Company has awarded the contract for a new factory building to Herbert A. Kamm of Pasadena. The structure is to be of brick and steel, one-story, and will cover 60 by 200 ft. Union Iron Works of Los Angeles are architects.

SANTA BARBARA, CAL.—The Masonic Temple Association has been formed to handle the new building enterprise and Geo. W. McComber was elected as president of the organization. The plans contemplate the erection of a 5-story lodge building to cost at least \$175,000.

SAN BERNARDINO, CAL.—The bond issue for the \$200,000 city auditorium is available and Architect Howard E. Jones has been retained to prepare the plans. These will be ready March 1st. The building is to be brick, fireproof throughout, and will seat 2750 people.

LOS ANGELES, CAL.—Oliver Morosco is planning to erect a \$1,000,000 theater building at Seventh and Hope streets. A theater, to be known as the Music Box, will be erected on Hill street between Seventh and Eighth, at a cost of \$250,000. It will be financed by Mose Cohn, Joe Howard, et al.

LONG BEACH, CAL.—The Long Beach Milling Company will erect a new milling plant on the property at Willowville near American Avenue. E. I. Harnett, president of the company, is authority for the statement that the company will construct warehouses, mill building and other structures.

GLENDALE, CAL.—The Power Implement Machine Works of Modesto has acquired property at the intersection of San Fernando Road and Glendale Avenue where they propose to construct a factory building at once. J. J. Ferlin, president of the company, estimates the cost of the first unit at \$25,000.

LONG BEACH, CAL.—The apartment house to be constructed for Omar Hubbard will be 11-story instead of 7-story as first announced, according to plans now about completed by architects John Parkinson and Donald Parkinson, of Los Angeles. The building will be class A and will provide 118 apartments.

POMONA, CAL.—Robert H. Orr, architect of Los Angeles, is preparing the plans for the new zoological laboratory building which is the gift of D. D. Crookshank of this city. The structure will be 2-story, fireproof, of reinforced concrete and is estimated to cost \$100,000. Work on the excavation has commenced.

LOS ANGELES, CAL.—The Forum Theater Corporation will award contracts for a new theater building about March 1st, to be erected at the corner of Pico and Norton avenues. Plans are being prepared by Architect E. J. Borgmeyer to accommodate 2,000 people. The theater will be especially complete and the equipment will be the best obtainable.

VERNON, CAL.—The California Dressed Beef Company will rebuild its plant destroyed by fire three months ago. Plans for the first building upon which bids are now being received call for a 3-story structure, fireproof construction, of concrete and tile. The building is to be 185 ft. by 350 ft. and will contain three elevators.

SEAL BEACH, CAL.—The city clerk has been taking bids for the water works system as planned by Olmstead and Gillelan, consulting engineers. Bonds to the amount of \$50,000 have been voted to fund the project. The water will be purchased from the city of Long Beach in accordance with an understanding said to be already agreed upon.

LOS ANGELES, CAL.—More than twenty bids were received by the Union Pacific Railway Company for the new freight house and office buildings to be erected at Alameda and Hunter streets. Lynch-Cannon Company of Salt Lake City were awarded the contract at \$210,500. John and Donald Parkinson are the architects for the engineering department of the railway company.

VAN NUYS, CAL.—The Los Angeles County Flood Control District has filed application with the state authorities for the appropriation of 10,500 acre-ft. of water in the Pacoima Creek canyon. This is part of the irrigation and flood control project which will give full protection to the agricultural and business interests of this section. The cost when complete will approximate \$1,500,000.

THE INTERMOUNTAIN DISTRICT

EVERGREEN, COLO.—A \$26,000 bond issue has been voted for the construction of a new school house.

PUEBLO, COLO.—An agreement has been reached for the immediate construction of a National Guard armory to cost \$65,000 at the state fair grounds.

DENVER, COLO.—The West Side Institutional Church, of which the Rev. L. S. Ross is pastor, will build an \$80,000 church at West Sixth Avenue and Santa Fe Drive.

LOVELAND, COLO.—The Elks Lodge of this city has completed plans for a \$50,000 two-story club house, to be constructed of brick and terra cotta. Work will commence at an early date.

BUTTE, MONT.—The Electrical Development Corporation, of Butte, has been incorporated for \$50,000, by Abe Blaustein, E. N. Genzberger, J. Fischer, John Hample, Louis Pohn-dorf, G. W. Mikel and Sol Genzberger.

DENVER, COLO.—Two new bridges over Cherry Creek, to cost approximately \$40,000 apiece, will be built this spring, according to Walter B. Lowry, city manager of parks and improvements, who will let the contracts.

BILLINGS, MONT.—Announcement has been made that the Glengarry Mining Co. will build a smelter at Laurel for the smelting of ore from Cooke City. Negotiations are under way for the purchase of a tract of land at Laurel.

DENVER, COLO.—Col. P. J. Hamrock, state adjutant general, has announced that ten National Guard armories costing \$470,000 will be erected this year at Monte Vista, Fruita, Craig, Manzanola, Fort Morgan, Canon City, Brighton, Delta, Brush and Lamar.

DENVER, COLO.—The Cameo Theatre Company has purchased a site in the exclusive Park Hill district and if the city permits will build a \$100,000 motion picture theater. N. A. Steinbruner and John J. Post, with offices at 4638 East Twenty-third Avenue, are directing the project.

SALT LAKE CITY, UTAH.—The Blue Mountain Irrigation Company of Monticello, Utah, has filed with the federal power commission at Washington an application for a license covering a small constructed plant on the La Sal national forest of a capacity of about forty horsepower, with about thirty miles of transmission line. The plant is used to supply power for domestic and municipal purposes in the town of Monticello.

POCATELLO, IDA.—Articles of incorporation have been filed at the office of the county clerk by the Targhee Power Company. Pocatello is stated as the principal place of business and the firm has a capital stock of \$300,000 divided into thirty shares at a par value of \$10 each. Of the amount of stock \$1020 is actual subscribed for by N. P. Bean, James M. Ingersol and E. C. White. The company is formed for the purpose of developing both electric and water power.



Chinese Versatility

From Peking we are sent a catalog of Hop Sheng and Co., Ltd., who not only "are high class ladies' tailor," but can supply "cloth, etc., towels, All Kind of Toilets, etc. etc. etc.," to say nothing of coal at various prices and "current weights." All this besides the following select curios which are taken from a list of several hundred:

- 1 Bottle, western colored
(We presume this refers to the period prior to the 18th amendment.)
- 1 Pot, crackery

PAINTING

- 1 Minister's Happy Family
- 1 Blossom on a Plum tree
(Or, a bad year in the Santa Clara Valley.)
- 1 Album of horse

METALS

- 1 Sacrificial vessel.

They go on to say that "Fee We Always Charge Very Lower and Reliable According the Regulation."

* * *

Our Daily Trade Report

Gray Goods Show Rising Tendency

—especially on windy street corners.

* * *

In the Heat of the Cold Spell

The "Butte Miner" reports that "the maximum degree of cold during the week was 18 degrees registered on Saturday, while the minimum was 6 degrees on Monday last." Which reminds us of the Pullman clerk who recommended the upper berth because the higher is the lower and the lower is the higher. "You'll have to go higher," said he, "if you want the lower, but if you're willing to ride higher, it will be lower in the end."

* * *

Problem of Conduct

Mr. Daniel A. Masters, enjoying the services of Lydia Irene Easton, a stenographer, dictates a letter to a friend. Should Miss Easton follow the usual practice of putting the initials in the corner?

* * *

More Statistics

According to a recent bulletin issued by the company, pins to the amount of \$11,936.20 were used by the Southern Pacific system during the past four years and ten months. Allowing 25 pins per cent, which is a conservative figure, this means 29,840,850 pins. Of these it is estimated that 1,704,000 were used to pin cuffs on stenographers and station clerks; 6,341,007 were picked up off the floor by superstitious employees and carried home in lapels; 3,000,041 were carried in the pockets of locomotive engineers for minor repair work; 7,541,730 were passed on by thoughtful conductors to flustered mothers who had not provided the requisite number of safety pins for the trip, and the remaining 14 odd million were

divided among the more orthodox uses invented by office boys and vice-presidents.

* * *

The mediaeval exclamation "God save the mark" is now said to have become the national prayer of Germany.

* * *

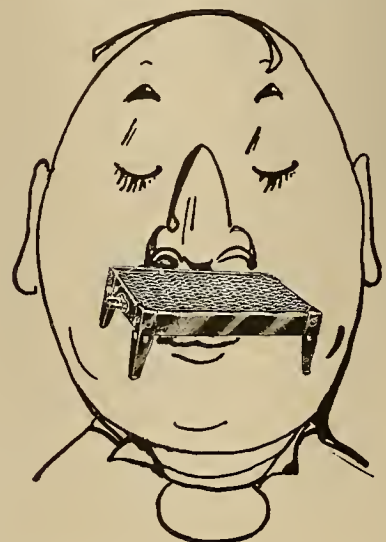
Resolutions for the Year 1922

Members of the San Francisco Development League found the following elec"trick" re"solutions" "deposited" on their "plates" at a recent January luncheon. Max Loewenthal of the Globe Commercial Company was the guilty party.

With the sound of New Year's "bells" still "ringing" in our ears, "transforming" the old year into the new, it is well to "reflect" and "charge" ourselves with the "high duty" of turning a searching "light" upon our own lives; "grill" ourselves, so to speak, and with all the "power" at our command, make re"solutions" for the coming year. Let us "exhaust" every effort to lead a "cleaner" life during the "current" year. To keep in "tune" with every noble impulse and "radiate" happiness and goodwill; to "switch" from wrong practices to right, "watt"ever "resistance" we may encounter, and to exert our entire "capacity" to this end. To "iron" out our shortcomings, and "fan" every "spark" of kindness into action, "choking" every evil "impulse" within us. To be an "outlet" for the noblest inspirations, a "generator" and "transmitter" of helpful thoughts and deeds. To "plant" seeds of kindness, in whatever "field" our "range" of activities may take us. To in-"fuse" standard methods into our business and to "cut-out" unfair practices, to learn that to "cell" with the least "impedance" one must work at "high-pressure." That a "dynamic" personality becomes "magnetic," and, that to "alternate" an "input" of recreation with an "output" of work we "break the circuit" of "continuous" drudgery. And when our Miss Opportunity arrives we can "meter" with confidence, "receiver" fully prepared and, "welded" to a belief in the Golden Rule, by these resolutions we may become, to a large extent, the "controllers" of our own destiny.

* * *

ELECTRICAL HYBRIDS



BXI — The Electric Grillustrious Citizen

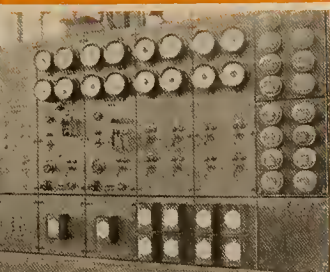
The grillustrious citizen's often at table,
At the making of toasts he's a winner;
To keep matters warm he most amply is able
And he certainly adds to a dinner.

Journal of Electricity and Western Industry

Craft & Copy

March 1, 1922

San Francisco



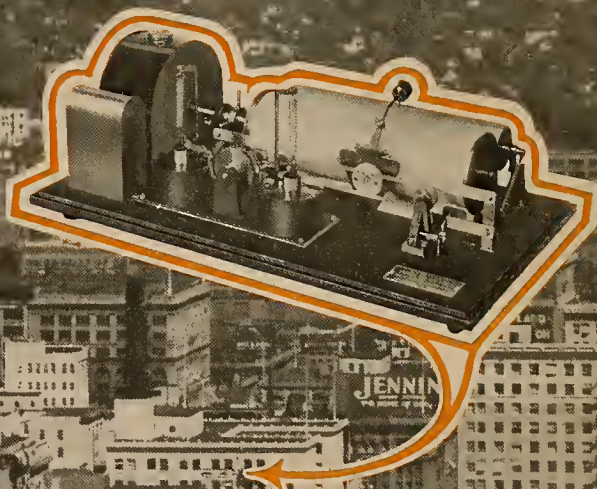
STEVEN'S Long Distance Water Level Recorders and Indicators provide

- an instantaneous reservoir reading for the switchboard operator.
- a permanent graphic record for the general office in the city.

Can be operated over telephone lines—requires only one wire—uses direct or alternating current.

LEUPOLD, VOELPEL & CO.
PORTLAND, OREGON

Barthold-Strecker Co. Brown & Lindstrom Co.
San Francisco Los Angeles



A PORTION OF PORTLAND, OREGON
MT. HOOD IN BACKGROUND

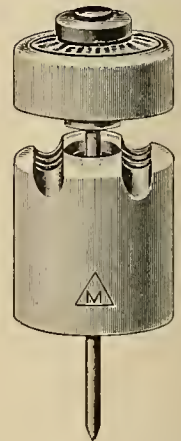


THE
"BULL DOG"
ASSEMBLED SPLIT KNOB



"Has a Grip
Like It's
Namesake."

Made and Sold Under License
U. S. Patent Feb. 3, 1920
by



Illinois Electric Porcelain Co. Macomb, Ill. U.S.A.

Order It From Your Jobber

Pacific Coast Distributors

Baker - Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, MARCH 1, 1922

NUMBER 5

Journal of Electricity and Western Industry

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydro-electric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1921, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Power
Coal Age
Electrical World
Bus Transportation
American Machinist
Ingenieria Internacional
Electrical Merchandising
Electric Railway Journal
Engineering News Record
Engineering and Mining Journal
Chemical and Metallurgical Engineering
Electrical Review and Industrial Engineer

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

181

Functions of a Business Paper in the Service of Industry—Lower Freight Rates in the Green Fruit Industry—The Tide of Bus Transportation—Impartial Research in Home Appliances—Advertising Western Progress—An Eastern Farm Situation—Club Spirit During the Past Year.

Transcontinental Freight Problems vs. the Panama Canal 189

By JOHN CUSHING STONE

Discussion of the possible solutions of the prevailing unbalanced rate situation.

Should the Pacific Coast Expect a Severe Depression in 1923? 191

An answer by Walter V. Woehlke to the statement by Roger Babson that the Pacific Coast should prepare for further depression.

Western Power Companies Push Electric Range Campaigns 192

Survey by Journal of Electricity and Western Industry shows nine electric range campaigns under way in western states.

The West Harvests Returns From Electrical Home Campaigns 194

Increased activity on the part of educational campaigns as result of successes of early efforts, particularly in California.

Progress of Industry Handicapped by Lack of Engineers 195

By LOUIS F. LEUREY

The concluding article of a series of three describing the effect on industry of the lack of industrial electrical engineers.

A Few Ideals to Shoot At 197

Some suggestions for commercial policies, advanced to bring about a unity of effort in all parts of the nation.

At the Source of Wealth in the Northwest—Frontispiece	179
Western Comment on Current Events	184
Letters to the Editor	186
Radio Bulletins	187
Builders of the West—Charles C. Gates	188
"Natural Steam" Plant Is Proposed at The Geysers in California	193
Factory Installation Combines Safety with Economy	198
Self Improvement in Salesmanship	199
Increasing Production in Industry	201
Western Dealer, Jobber and Agent	203
Activities of the West	206
Meetings of Interest to Western Men	211
Personals	212
Manufacturer, Dealer and Jobber Activities	214
Business Outlook in Western Market Centers	215
Construction News and Industrial Developments	216
Salvage	218

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of California, Rialto Building, San Francisco

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



AT THE SOURCE OF WEALTH IN THE NORTHWEST

From the variety of its charms of flower, pine and glacier to the potentialities of development which are represented in the natural reservoirs of its snows, Mt. Rainier is typical of that land of boundless resource which is the Northwest. From its summit can be viewed the greatest body of standing timber remaining in the United States today. Close about its feet is the Puget Sound region of growing industry and expanding commerce. To the east beyond the succeeding ranges

of the Cascades lies the great Columbia basin project, which with the area of the Colorado, offers the greatest undeveloped agricultural opportunity of the country today, awaiting only the application of water. And upon this summit and within sight of its peak, is the fuel and foundation and the motive power for all this development—the great water power resources which are the primary wealth of the Northwest, a wealth it possesses in greater abundance than any other section of the nation.

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 5

SAN FRANCISCO, MARCH 1, 1922

Per Copy, 25 Cents

Functions of a Business Paper in the Service of Industry

FROM a year of service as special adviser with the Department of Commerce, F. M. Feiker, vice-president of the McGraw-Hill Company, returns with a broad vision of the needs of business and the part which the business press may play in the service of industry. He points out the factors which affect the present economic position of the country and the absence of a clear-cut program on the part of business for their solution.

With the American belief in a continuously increasing standard of living combined with the necessity for competing abroad upon a low cost basis, the broad problem of the elimination of waste becomes one of the fundamental answers to our economic situation, as is also the problem of distribution, without a solution for which, any question of increased production is not more than academic.

The forces which are at work attempting to bring order out of chaos are placed by Mr. Feiker in the following order as educational agencies:

1. Business and engineering press
2. Associations and societies
3. General press
4. Government literature
5. Educational institutions.

The part of the business press lies in two directions—first, in finding out and reporting what these

various educational forces are doing toward the solution of economic problems and, second, in taking to them broad ideas and plans which come out of the close association of the publishers with industry and in which the business press takes the initiative to get something started. No other agency has so well organized a medium of expression, nor so select an audience as the technical press for spreading education in the industrial field.

From the standpoint of this opportunity so clearly pointed out by Mr. Feiker, the Journal of Electricity and Western Industry stands in the favored position for the service of our western industry. In advertising columns and editorial pages alike, it is our province to bring the report of the best which technical research or government leadership may develop toward the solution of these fundamental problems in their western aspects. And from the intimate contact which this paper maintains with western development, we can further take the lead in spreading new movements which thus brought to the attention of other mediums for research and application, may help in the formulation of progressive business policies for the West and for the nation.

It is our desire, as expressed by Mr. Feiker, to "become recognized as having a part in getting some of these great purposes accomplished."

Lower Freight Rates in the Green Fruit Industry

THERE is a vital point at issue for the thoughtful consideration of all well wishers of the West in the present agitation of the Green Fruit Producers to lower freight rates to eastern distributing centers.

The Journal of Electricity and Western Industry holds no brief for the railroads in this fight, nor does it throw its weight unreasonably with the producers. The facts simply stated are these: When a western industry finds rates have been advanced to such an extent that it ceases to be able to function profitably in getting its product to eastern market centers, then these specific rates should be lowered unless the rate base as a whole is thereby affected to such an extent that the carriers cannot maintain service with profit. Thus it is seen that the West is directly affected in this investigation from two

distinct angles—first, the life of one of its productive industries is at stake, secondly, the upholding of the transportation structure, the very artery for all industrial life in the West, is involved.

The specific points at issue in this move of the Green Fruit Producers are set forth in considerable detail on another page of this issue by one who for years was associated with the traffic department of one of California's well known traction companies.

Generally speaking, the public is not by any means convinced that the Green Fruit Producers have been hard hit by increased rates. There are too many well authenticated cases of fabulous returns that have accrued to western shippers in the green fruit industry during recent years for anyone to believe at first glance that this flourishing industry is seriously undermined. On the other hand the railroads as a whole are known to be far from being

out of the woods in the matter of sufficient earning capacity to keep rolling stock and road bed in the highest state of efficiency for western needs.

Our railroads must be able to pay a reasonable return on their investment. Unless this is assured investors, little hope can be held out that the vast sums of money will be available to carry out the much needed extensions and improvements that the West must have, to meet its present unprecedented growth. This rate investigation involves a gigantic revenue to the railroads and as a consequence is one of unusual interest to the West. Readers of the Journal of Electricity and Western Industry will be kept informed to the fullest degree as this investigation progresses, for there is much more at stake for western industry as a whole than would seem apparent at first analysis.

The Tide of Bus Transportation

IF, at the moment when the first automobile was frightening horses and country visitors upon the city streets, the League for the Protection and Perpetuation of Hansom Cab Drivers had visualized its impending doom with sufficient vividness to have held an indignation meeting of its members, their attitude would have been recognized as both natural and justified—but would not have done much good. The present era of resolutions against auto stages and auto truck transportation on the part of railroads and street railways contains some element of this futility of a protest against progress. The service of this new form of transportation in building up isolated communities and in stimulating traffic has shown that it is here to stay. Insofar as there is still a lingering hope with railway men that such transportation may be abolished and the good old times before this disastrous competition may return, that hope is doomed to disappointment.

This is, however, by no means the entire story. Bus transportation may indeed be here to stay, but it should be required to win its laurels without special subsidy or privilege. The railways are thoroughly justified in their complaint that the competition from which they suffer does not compete with them on equal terms. They must provide the capital and pay taxes to the government upon a tremendous investment in track, the upkeep of which is one of their major running expenses. At the same time, the state is providing highways free of charge for the use of commercial automobile service, and keeping them up to good condition at its own expense.

There are two things which would help to remedy the situation. In the first place, taxes and license fees upon bus systems should not be based upon the comparatively negligible investment but upon the amount of business conducted, which would be in direct proportion to the extent to which the highway is used—and this sum should be sufficient to cover a just proportion of highway expense. In the second place, the final limit of load which will be allowed upon the highways should be fixed now for a definite period ahead, or until the character of

the highway shall be changed from its present standard—and, what is not done under the present inadequate provision, this measure should be enforced.

Two provisions of this nature would do much toward placing bus transportation upon a fair basis. We want the benefit of its contribution and it should not arbitrarily be ruled out—but it should be made to pay its way as it goes along.

Impartial Research in Home Appliances

WOMAN'S interest in electricity will always center in the use of electric labor saving devices in the home. If the "electrical story" is to be told the feminine part of the population, therefore, it must be linked definitely to this field. Obviously it will be a story of economy and efficiency, of the service back of the light and power which is available for home use, the reason for rates and the costs of operation.

As a preliminary step to any such campaign, an impartial investigation is needed of the economy and efficiency of electrical labor saving devices. There have been many such investigations made by manufacturers or groups of electrical men which have had their very great value and which form the basis for practically all the advertising and the educational matter now directed toward women—but for purposes of argument, there is nothing which carries weight like the unprejudiced experimentation of a government research bureau or the verdict of the scientific department of a university. Such a comprehensive investigation can be started any time the electrical industry is prepared to furnish the equipment and funds for a fellowship for such an investigation, either with the government or with a university of standing.

Our western educational institutions have at all times stood ready to cooperate with industry to the fullest extent. Such a fellowship would bring a full return, not only in the young women it would train for later association with the industry, but in the impartial testimony it would provide for ammunition in any educational campaign which is to have the forwarding of the home use of electricity as its object.

Advertising Western Progress

CHAMBER of Commerce advertising has done much to bring before the rest of the nation the opportunity of this western empire and to make known the names of the growing cities of this coast, alike to visitors who seek beauty and climate and to manufacturing enterprise seeking a western home. It is doubtful, however, how much harm is mixed with the good which Chambers of Commerce accomplish. Within the past few weeks, we have had the spectacle of Los Angeles claiming to be the foremost manufacturing city on the coast, on the ground of the number of employes engaged in this activity, while San Francisco publicly announces their mis-

take and points to the greater output of products manufactured from the northern California city. Oakland, California, enthusiasts on the other hand, are authors of a pamphlet featuring Oakland as the city of most rapid manufacturing growth on the Pacific Coast, to which Portland has replied with census figures showing their own precedence in this field. Everyone is familiar with the type of literature to which certain chambers of commerce are addicted, which consists of a map showing the number of steamship lines or railway systems serving their city, with only a few scattering lines calling at other rival ports. Occasionally the rival port takes the trouble to refute the inaccuracies of such a map—more often it is ignored.

Of what good can literature of this sort be to the Pacific Coast? No one is deceived by it—or if they are momentarily, they are speedily undeceived by the injured rival community with consequent injury to all concerned. There is plenty to be said in behalf of the West which is strictly true and which will have weight as business argument. There is a painful need for business statistics in regard to almost all of these western communities. There is, in short, a very legitimate field for Chamber of Commerce activity, which few western chambers have yet had the enterprise to fill. A little more energy devoted to business research and study and to the providing of figures and photographs of interest to those seeking information will result in more favorable publicity to the West than many boasting pamphlets whose figures cannot be substantiated. As the Journal of Electricity and Western Industry has had occasion to say before, it is time the West outgrew the age of small town rivalries.

An Eastern Farm Situation

OUTSIDE of a few large cities in the Northeast, no telephone development is being made, while many farmers are still without any kind of service, according to Wm. J. Thompson, addressing a body of Maine farmers. At the same time, most small villages and farms are still without electric lights and while it is not profitable to extend the lines far into the country, there are many sections that might be developed if we had the old-time enthusiasm for such work. The reasons for this, he points out, are many, the major one being that "for the past twenty years the widespread wholesale muckraking criticism of all public utilities has bred a feeling of distrust on the part of the public. If we do not want these utilities," he concluded, "we could not do more to get rid of them than we are doing now."

These conditions are far from typical of the West, where the power companies have shown a most progressive attitude in carrying on the necessary pioneer work for the development of farm districts. In consequence western farms today use more electricity than those of all the rest of the nation put together.

There is, however, some present danger of the western farmer falling into the same trouble as his

eastern brother. Stimulated by those who feel that all the ills of the universe might be cured through government ownership of public utilities, there is an inclination toward questioning the decisions of the utility commissions and of criticising generally the morals and intentions of the power companies. It is believed that this is merely a temporary phase and one which will yield to a saner viewpoint following the fall elections, but for purposes of comparison, the above statement of eastern conditions is offered as presenting the other possible extreme of the picture.

Club Spirit During the Past Year

AMONG the achievements in which the electrical industry may take just pride is the progress made during 1921 in the growth, size, and usefulness of the many club organizations composed solely of the men in the electrical field. It is well that the public should hear more about the activities of the great industries in the West. Especially is this true of the electrical business because of the opportunity and necessity for correctly informing the people at large of the benefits incident to the latest developments in the electrical arts.

Few electric clubs were carrying on in the West prior to 1921. The memberships were limited and the activity necessarily restricted. This is rapidly changing and the vision of usefulness is broadening constantly.

Whether the clubs are composed of individuals associated with a single company or made up of men from all branches of the industry, there will be much good resulting from this association just so long as the motive is to render a better, more efficient service in return for moderate compensation. A good example of the growth within a single industrial concern is that of the Southern California Edison Company which began in 1921 with but one Edison club and within twelve months grew to 28 clubs actively participating in the affairs of greatest interest to them in their respective communities. The Los Angeles Electric Club with its membership close to 700 and the San Diego Electric Club with 100 per cent of the local industry active, are among the Electric Clubs which in every city of the West have been showing the latent force of the cooperative spirit. The San Francisco club was the recent winner of an intercommunity attendance contest, the Oakland club is growing into the banner organization, and the recently organized club of Seattle is showing the west-wide spread of this interest in inter-industry service.

In no other part of the nation does electricity play such an important part in economic and social life as in the West, and with the development of a great interconnected system of power lines and an increased domestic and industrial use of electricity it is not unlikely that there will develop a great association of Electric Clubs in western cities fostering the electrical idea.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

San Francisco Manufacturing Survey

Seventy Per Cent of Local Industries Operate on Open Shop Plan, According to Recent Chamber of Commerce Investigation

RESULTS of the recent survey just completed by the San Francisco Chamber of Commerce with the assistance of students from the University of California, indicate that the total manufacturing output of San Francisco industries for 1920 is in the neighborhood of \$600,000,000. This covers eight of the largest groups of manufacturers in the city, including 380 firms in the metal group, 302 in the manufacture of food, 227 in paper and allied products, 205 in textiles, 187 in wood, 135 in miscellaneous, 102 in chemical and 57 in leather. Results of the survey may be tabulated as follows:

	Number of Plants	Value of Output	Number of Employees	Payroll
Food	302	\$175,402,301	10,991	\$13,445,700
Metal	380	137,281,180	21,816	28,349,763
Textile	205	48,267,478	7,045	7,244,509
Chemical	102	32,838,850	1,525	2,366,576
Paper	227	29,089,962	5,199	8,242,476
Wood	187	20,919,600	3,667	5,114,800
Leather	57	9,903,025	1,580	1,802,452
Miscel.	135	39,403,001	5,000	6,237,435
Total,	1,635	\$493,105,397	56,823	\$72,803,711

The average output per factory was \$301,593, the average per capita payroll of persons engaged in manufacturing was \$1,281. The average number of employes per factory totaled 34. This is a somewhat higher average than that given by the census, owing to the fact that fewer small establishments were included.

Of the total number of persons engaged in manufacturing in San Francisco, 48,862 or 77.2 per cent, were employed in open shops. This does not mean that all of these persons were not members of unions, but does indicate the rapid spread of the open shop policy. Those engaged in factories managed on a closed shop basis totaled 4,992 or 8.7 per cent. The number of those employed in shops whose policy was not stated was 8,039.

Of the total 1,635 concerns studied, there are 1,065 or 65 per cent, operating as open shop establishments, 206 as closed shops and 365 shops which failed to specify their policy.

The survey showed that 989,176 barrels of fuel oil were consumed in these manufacturing industries, a total of \$352,955 was expended for gas and \$1,018,507 for electricity.

Rate Reduction Asked by Utah Farmers

Appeal Before Utah Commission Asks Reduction of Power Rates as an Emergency Measure Affecting 1921 and 1922 Rates

THE question as to whether power rates may be modified by conditions which affect the profits or lack of profits of the consumer is involved in the power case now before the public utilities commission of Utah. The farmers of that state using electric power for irrigation apparently do not question the justice of the present schedule but make the appeal that the rules and regulations governing the operation of pumping plants be changed so that provision might be made for tapering off on power consumed both at the beginning and end of the irrigation season. They declare that an emergency exists in the industry, in view of which they ask that for the present year and for 1921, the power schedule in effect before the decision of the commission last March should be placed in effect. This would result in a payment of over \$25,000,000 less to the power company than is provided under the rates allowed by the utilities commission.

There are several interesting features of the case, notably that of an appeal by the farmers from rates for which they have already been legally billed under a commission ruling and also the question as to whether rates shall be determined by the ability of the consumer to pay.

The power company does not allow the legality of either of these proceedings but has expressed itself as willing to abide by whatever decision is reached by the commission in this case.

Western Factory for General Electric

Later Construction of Western Factory Branch Seen in Purchase by General Electric Company of 24-Acre Site in Oakland

ANOTHER western factory branch in the electrical field is seen in the announcement by the General Electric Company of the purchase of approximately 24 acres of land in East Oakland, with the intention of improving this property in line with the extension of manufacturing activities in Oakland.

For some ten years the company has manufactured Mazda lamps in its Oakland factory. It announces at the present time that it has confidence in the future of the Pacific Coast and that looking toward this future growth, plans are being made ultimately to manufacture certain of its products in a factory to be built at the new location.

This announcement is in line with the recent purchase of the former Kilbourne and Clark plant in Seattle by the Westinghouse Electric and Manufacturing Company and the opening last year of a warehouse and assembling plant for telephone equipment by the Western Electric Company at Emeryville, California. The movement is a significant one for western industry.

City of Tacoma Offered Cheap Power

Puget Sound Power Company Offers Surplus Power for City Use at Ten Per Cent Below Cost of Lake Cushman Development

POWER will be furnished to the City of Tacoma at ten per cent below the cost of producing it at the Lake Cushman site, if the offer of Puget Sound Light and Power Company now before the city officials is accepted. The proposition is that an impartial board of engineers be appointed to determine what the cost of power development would be should the city go forward with its project. The power company then agrees to sell power to the city at a rate ten per cent less than this cost.

According to R. T. Sullivan, manager of the Stone and Webster companies, the interest of the power company in this matter is in seeing Tacoma grow under the stimulus of cheap power, so that the street railway lines, also owned by the Stone and Webster interests, will have a better chance for success. He points out that the street railway has 60 miles of lines for a population of 100,000, or about twice the normal investment for the size of the community.

The power company is able to make this offer, according to Mr. Sullivan, because of their own advantageous developments and also because of their interconnections with plants in Spokane, British Columbia and Oregon. The offer was made in the conditional fashion rather than as a flat rate in order to make the company's position entirely clear and to forestall any controversy as to the relative advantages to the city of the two propositions.

Among the elements of the situation now being considered by the city is the question whether, if this offer is accepted, they will not lose their right to later development of the Lake Cushman site. A decision is expected soon.

Water Power Filings on Utah Rivers

Utah Power and Light Company Proposes Million Horsepower Development on Green River in Power Commission Filing

EXTENSIVE contemplated power development in Utah is revealed by the publication of water filings by the Utah Power and Light Company on the Green River, between the Flaming Gorge in the northeast corner of the state of Utah and Rattlesnake Creek. The company has also filed an application for a preliminary permit to develop all the power in Yampa River in northwestern Colorado. The proposed developments in Green River consist of six dams, as follows:

Swallow Canyon	110 feet high
Echo Park	310 " "
Island Park	100 " "
Split Mountain	170 " "
Minnie Mand	190 " "
Rock Creek	175 " "

Four dams are proposed on the Yampa River, as follows:

Juniper Mountain	200 feet high
Maybell	120 " "
Lily Park	250 " "
Blne Monntain	210 " "

A power house will be located at each of the dams.

These projects, together with the Flaming Gorge and Rattlesnake Creek projects of this company, will have an estimated installed capacity of approximately 1,000,000 horsepower.

This announcement follows closely upon the publication of construction programs of several of the California and Northwestern companies and indicates that there is no lessening of the power program as outlined by western companies last year, but that the estimates of future developments there made will in all probability be exceeded.

Electric Projects Planned for Orient

Electric Factories and Power Plants Reported From Japan, China and Australia—German Competition Active in Soochan

GREAT activity in the electrical field is reported from the Orient by the representatives of the Department of Commerce, with numerous opportunities for sale of equipment, as well as possibilities for the investment of American capital. Among the projects contemplated are the following:

Australian Railway Purchases for Power Signaling

Tenders will be received by the Victorian Railway Commission on March 8, 1922, for 35 cabin transformers for power signaling. No specifications, conditions, or tender forms have been received. Firms having local representation in Australia should take this matter up direct through such agencies.

Tokyo-Nikko Electric Railway

A company at Utsunomiya, Japan, is making arrangements to construct a high-speed electric railway between Tokyo and Nikko, at an estimated cost of 10,000,000 yen. Construction work is expected to be completed by next summer. The distance between Tokyo and Nikko will be covered in an hour and a quarter.

Electric Meter Factory in Japan

Siemens, Schuckert & Co. and the Furukawa Electro-Industrial Co. have decided to erect a factory for the purpose of constructing meters capable of measuring weak electric currents. No such meters are made in Japan at the present time.

The Kyoto municipality is planning a large electric power station (steam) at an estimated cost of 4,300,000 yen, to be completed within three years. The total area covered by the station will be 3,000 tsubo of which 500 tsubo will be occupied by buildings of reinforced concrete and brick. Two generators, each 5,000-kilowatt capacity, will be installed.

Electric Lighting Plant, Kashing, China

It is reported that an electric light plant is to be constructed at Pu-yuan-ching, Kashing, Chekiang Province, China, by the manager of the Kashing Telephone Co. Registration of the company has been made with authorities.

Electric Light Plants in Manchuria

The terms offered by German manufacturers of electrical goods are becoming a strong factor in the China market. This is particularly true in the line of industrial machinery and plant equipment. Very recently, according to Commercial Attache Julean Arnold, at Peking, the German Siemens, Schuckert Electrical Co. formed an alliance with Chinese interests for the development of a large electrical manufacturing plant at Soochan. The investment of American capital and cooperation with Chinese financial interests are important means for taking fullest advantage of opportunities offered by the Chinese market.

Letters to the Editor

Advocates Promotion of Fire Alarm and Signal Systems by Contractor-Dealers

To the Editor:

Sir: I have read with a great deal of interest the article appearing in the October 1st issue of the "Journal" by Mr. E. R. Murray, entitled "Alarm Systems Offer Opportunity for New Wiring Business." I cannot add to anything that Mr. Murray has said, but I am taking the liberty of making a few comments, which I trust will be of interest.

The field of signalling and communication, other than the regular telephones for cities and industrial plants, is one that on the Pacific Coast has been barely scratched, but is one that with intensive cultivation will yield rich and continuing returns. It is a field that belongs properly to the electrical contractor-dealer, that is to say, a field that should be explored and developed by him and not by manufacturers or jobbers, although these latter parties are at all times willing and anxious to cooperate and furnish special information.

The electrical contractor-dealer, in the past, has been thought of as being familiar only with power and light wiring and installation, household appliances, and the simpler forms of push button signals. The installation of an interior telephone system, or of a fire alarm, or police patrol system was considered as requiring, if not the services, at least the supervision of a specialist. This does not apply to all electrical contractor-dealers, but it will find application among quite a number.

The theory of signalling systems is simple, and no different from that of other electrical circuits; the wiring diagrams can be easily interpreted by anyone familiar with reading blueprints; the apparatus has been developed to a point where its installation will present no special difficulties.

In the smaller cities not having paid fire-fighting organizations, the live electrical contractor-dealer should be, if he is not already, an active member of the volunteer fire department. His special knowledge will make him the man to whom the city officials and other members of the department will naturally turn for information on electrical matters, and this relation will not only bring him city business, but will enlarge his reputation and acquaintanceship, and bring private business as well.

Getting back to the matter of bank protection systems, the principal subject of Mr. Murray's article, protection of this nature is needed, especially in the smaller cities as evidenced by the frequent robberies mentioned in the papers. It is assumed that the modern electrical contractor-dealer has a bank account, and as a depositor has or should have a lively interest in knowing that his money is adequately protected. In his capacity as a depositor, as well as being the local electrical expert, he is the proper person to present and urge the installation of a bank protection system on the bank officials. The first installation having been made, others will come along easier.

The installation of a system in a single institution with an alarm signal either in the same building or outside, or in police headquarters or elsewhere is good, but the opportunity of the electrical contractor can extend farther than this. A number of installations in banks, jewelry stores, fur stores, curio stores and other establishments where merchandise of high value and small bulk is handled, all interconnected with a central board, provides not only a large amount of installa-

tion work, but also a continuing source of revenue from maintenance, and the contractor that gets a good start along this line will, as more business develops, become more firmly entrenched and need not fear competition in this field in his locality. There has been developed in Seattle a very comprehensive system under private control that gives auxiliary fire and police protection as well as watchman's report service. This company maintains a central switchboard, a storage battery plant, and interchanges signals with the city police and fire department headquarters. It operates on the closed circuit system. It has been found that bankers and merchants are willing to pay reasonable rates for protection service of this character, which includes visits by armed guards when a signal is received or a watchman fails to report.

It should be emphasized that the system that gives the best possible protection should be installed. This is the closed circuit system, preferably with remote signals. Although apparatus that may be considered standard has been developed, no standard installation will fit all cases. Each job should be studied by itself. It must also be borne in mind that the members of the Yeggs' fraternity are also studying protection systems, and are very ingenious in their schemes to put them out of commission. In a small town recently, the electric power and light wires were cut about a mile beyond the city limits, thereby putting every building and the streets in darkness just before a bank was robbed. In another case, where an open circuit system was installed with wires in pipe conduit, a length of conduit was loosened from the wall, cut in three places with a pipe cutter, the pieces bent into a V and the wires to the gong cut one by one. This would have immediately turned in an alarm with a closed circuit system.

The planning and installation of signalling systems will be found to be very interesting as well as remunerative and are worthy of more attention on the part of electrical contractors and the public.

J. R. KING.

Western Electric Company, Seattle.

Some Objections to the So-called Cooperative Profit-Making Enterprises

To the Editor:

Sir: In response to your inquiry regarding my opinion as to the objections to certain types of so-called "cooperative enterprises," that is, enterprises where the administration and financial functions have been assumed by the workers, I am pleased to submit the following common objections:

1. Laborers do not appreciate the value in service rendered by the administrative head and as a rule tend to reduce the administrative pay to the basis of wages.
2. Discipline is very difficult to maintain in cooperative societies for a very long period of time. There are many changes in the personnel and the spirit of self-sacrifice necessary for true cooperation develops slowly.
3. The size of present day business undertakings has as a rule outgrown financial possibilities of a group of former employees. Of course, this is not the case in every line, but is an important factor in most enterprises.
4. Banking credit is not liberally extended to cooperative societies because of the depreciation of administration, particularly accounting, and because of the instability of such organization.
5. There is a strong opposition to the cooperative movement coming from the trade unions. This is due on the one hand, to the fear that the interest in the one may be transferred to the other, and on the other hand to the difficulties involved when laborers who are members of unions

become employers. Some rules of the union, such as those regarding overtime and working conditions, are easily abused on the part of the cooperative society, which in truth reacts unfavorably upon the union. This is particularly true in Tacoma, at the present time, where several of these "co-operatives" in the electrical industry are charged with breaking union rules, while competitors of the cooperative have to abide by union regulations.

6. As a rule these organizations become an "advanced post" for socialistic and other propaganda. At the present time, in the Northwest the prominent leaders of the cooperative "shingle mill movement" (of which we have more than a score), have a hope that they may use the cooperative movement as a third rail for the promotion of a more ultimate purpose. Such leaders very often bring the movement into political allegiances unfavorable to business efficiency.

STEPHEN I. MILLER.

Northwestern Electric Service League.

Data Regarding Gaps Still Existing in Great Interconnected Power System

To the Editor:

Sir: As you know, there is a gap in the electrification of the Milwaukee Railroad in eastern Washington and western Idaho. This gap is two or three hundred miles and is clearly noted on your excellent map of western hydroelectric systems. According to my understanding there is no connection in the Coeur d'Alene district between the Montana Power Company and The Washington Water Power Company.

There is not now and no probability of there being in the near future any connection between Portland and Eugene, that is, any usable connection. The Portland Railway's transmission system ends at Salem, and the Mountain States Power Company extends from Albany to Springfield. It was hoped to connect Albany and Salem by a 66,000-volt line, but this scheme fell through. When the California-Oregon Power Company gets built into Springfield the Mountain States Power Company will undoubtedly build from Albany north into Independence, still leaving a ten mile gap between Independence and Salem. It may be some time before this gap is closed.

It is true that the Oregon Electric Railway operates a transmission system from Portland almost to Eugene, but it runs at 33 cycles and is not suitable for interconnection. The Southern Pacific Company has a transmission line extending from Portland almost to Corvallis but these are mostly 13,200-volt capacity and not susceptible of carrying all the load, and the Southern Pacific objects to their lines being used for commercial purposes.

LEWIS A. McARTHUR,

General Manager.

Pacific Power & Light Company.

Recommends Wide Publicity be Given Plans of Western Power Companies

To the Editor:

Sir: In your issue of February 15th, I think the plans of the western power companies as expressed in letters from the executives should be given wide publicity. This concrete proof that the various companies are planning even greater activities than had been previously reported will go a long way toward confirming the faith of those in the industry in the prosperous future ahead for these states during the coming years.

C. O. RHONA.

Ventura, Cal.

Radio Bulletins

The Journal of Electricity and Western Industry has chosen the following events from the business, industrial and engineering happenings of the week as its regular weekly news report:

The Western States Gas and Electric Company of Stockton, California, has filed an application with the State Railroad Commission to float five million dollars in bonds to finance a hydroelectric development on the American River. The plans call for a plant which will generate 100,000 hp. and will ultimately cost one hundred million dollars. A license has already been secured from the Federal Power Commission.

The San Joaquin Light and Power Corporation of California will immediately install a second 17,000-horsepower unit to the Midway steam plant at Buttonwillow, in order to supply power to the Southern California Edison Company over a period of ten months.

The General Electric Company has recently purchased a site in the industrial district at Oakland, California, where it will erect a million dollar factory branch. The company is reported to have paid \$100,000 for the site.

The Utah Power and Light Company of Salt Lake City has filed applications with the Federal Power Commission for use of the waters of the Green and Yampa rivers in Utah and Colorado through a series of nine power houses having an ultimate capacity of one million horsepower. The filings were made, it is understood, to protect the company in future expansions.

Congress has appropriated \$700,000 for the improvement of the Klamath Irrigation District near Klamath Falls, Oregon. The project is to be turned over to ex-service men when completed and is a part of a national government land settlement plan.

The Journal of Electricity and Western Industry offers the following review of business conditions in principal western cities:

San Francisco: Reports on foreign trade out of San Francisco during the year 1921 have just been issued, showing a drop of forty-two per cent in exports and fifty-four per cent in imports over 1920. It is estimated that the volume of foreign trade has not fallen off to this extent on account of the extreme price reductions during the year. Unprecedented building activities continue, building permits for January totaling approximately six million dollars. Sales are reported as fair.

Los Angeles: A survey showing the loss to the orange crop to be approximately fifty per cent has resulted in the abandonment of many of the plans for 1922 by the citrus growers' association. The purchase of a line of refrigerated steamers for carrying the crop has been given up, while advertising appropriations have been cut in half. Prices for the crop continue to rise, however.

Portland: Foreign trade continues to hold its own with last year, owing to large shipments of wheat and lumber. Portland was the only Pacific Coast port to show a gain in shipping during 1921.

Seattle: Wholesale houses are preparing for a big year and dry goods houses report buying for fall as well under way. Prices show a five per cent increase on the average. The lumber industry has just completed its best week since the war peak period, the industry operating at 88% of normal.

Salt Lake City: Interest here is centered in reports of various railroads and public utilities regarding taxation valuation of their properties for 1922. All of the companies place a less value on their holdings, the Denver and Rio Grande seeking to pay on approximately two million dollars less than last year.

Denver: Prices paid for cattle and sheep in Denver during the past week are the highest since June, 1920—an indication of a revival in this market. Business generally is improving beyond the expectations of the most optimistic.

Builders of the West

THE job of a mining engineer consists largely in devising production methods to fit economically with conditions in each instance different from those that have previously been worked out. It is an intensely practical occupation, developing in its followers a broad point of view and a distinct freedom from precedent. To be a successful mining engineer a man must be a capable executive and a business success. It is not strange then that one of the most successful businesses of its kind in the country, totally unrelated to mining, should have been developed by a mining engineer. The success of the Gates Rubber Company of Denver, Colorado, is directly attributed to the application of engineering principles to business problems by its president, Charles C. Gates, graduate of the Michigan School of Mines, and one of the successful engineers of

the West. Starting with a capital of \$3,500, Mr. Gates has in ten years built one of the largest manufacturing organizations in the West. Undoubtedly that simple statement sums up the story of this man, but it leaves out a world of thrilling details. His plant in 1912 was a small twenty-five by fifty foot workshop. Today, with acres upon acres of floor space, the Gates Rubber Company operates one of the most modern tire factories in the entire United States. Incidentally—as a side line, on might say—his company has become the largest manufacturers of automobile fan belts in the world. Radiator hose, another product, would seem a negligible item—yet they ship hundreds of miles of radiator hose monthly. The year 1921 is well known to have been an unsatisfactory year for the tire business as a whole, yet in 1921 Mr. Gates trebled his output of tires and in November resumed payment of profit bonuses to his employees, his company being generally credited with being the first in the rubber industry to return to a profit bonus basis. The man who has accomplished these things has become a cult to those who have followed his amazing conquest of national markets in the most highly competitive fields. Every product yet put on the



CHARLES C. GATES

Mining engineer, manufacturer and civic leader of Denver, Colorado, who has developed one of the most successful and progressive industrial organizations in the country.

market by Mr. Gates differs from others of its kind in some important respects. It is not enough for him that he makes a radiator hose, for instance, of best quality. It must have its own inimitable advantages of a clear-cut and practical nature. In this case his improvement was strikingly simple but it won him a market over-night. In the past, when a garage man had call for a piece of radiator hose he must measure the length required on the car and then measure, mark and cut that length from the three-foot section he carried in stock. Mr. Gates made a hose "marked in inches" on its outer surface. It is easily cut to length at a glance, without measuring or marking. Naturally, the dealer prefers handling this more convenient radiator hose, and Gates had by this simple means become a great factor in the hose market. So it is with his chief product, tires. Gates was not

satisfied to make a tire merely as good as any manufacturer could make. His tire had to have a distinct idea behind it, a definite advantage. The result was his designing of a tire in which the flexing point of the carcass would permit the use of a wider and thicker rubber tread. This, by the way, was an accomplishment long sought after by tire engineers. Gates perfected it, explained its advantages to tire buyers by means of the simplest kind of advertisement, and the resulting sales kept his factory working through the period of depression.

Like most extremely busy men, Charles C. Gates finds ample time for civic responsibilities. He is president of the Manufacturers' Bureau of the Denver Civic and Commercial Association. In this capacity he has recently effected a reorganization of this association into a more compact and workable form, after close study of the most efficient Chambers of Commerce in the land.

To Charles C. Gates, then, for his solution of the manufacturing difficulties which proved successful in a period of depression and for his development of an outstanding western industry, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Transcontinental Freight Problems vs. the Panama Canal

How the Present Readjustment Period is Awakening in the Minds of Western Shippers a Fuller Realization of the Prevailing Unbalanced Rate Situation and a Discussion of Possible Solutions

By JOHN CUSHING STONE
Consulting Traffic Engineer

FOR the Pacific Coast producer the present period of freight rate readjustment is one of anxiety. This is, of course, common to the entire commercial and industrial field, and yet there is every reason to know that insofar as transportation charges are concerned the situation must right itself and that no permanent distress will prevail.

The current high freight rates were brought about by the urgent and immediate necessity, first in 1918 and again in 1920, for additional revenue for the railroads, which could only be accomplished by blanket percentage advances. Many of these increases were justified then and still are. Many of them cut seriously into the profits of the shipper and some of them were ruinous even at the time. Later deflation in prices has added to the latter two.

The plan was justifiable only in that there was not the time in which to consider each individual commodity increase of itself. In one way this enforced action was a good thing. It is axiomatic that the revenues of transportation lines must be sufficient for their support. If, therefore, any given freight rate is unreasonably and unnecessarily low the burden of supplying the deficiency in revenue must fall on some other traffic with a resultant unnecessarily high rate on the latter. An example of this character of low rates can be shown in that carried on crushed rock for roadmaking purposes in 1917. The rate for hauls up to thirty and forty miles was 25 cents per ton. This was advanced to 50 cents and later to 60 cents per ton. This is a class of traffic necessitating an empty car haul in one direction. The increased rate is not unduly high, has not injured the rock industry to a degree calling for relief, and has accumulated additional revenue to lessen the burden on other commodities unable to stand the present charges.

Readjustment Is Progressing

These blanket increases had the effect of doing away with a vast number of dangerously low rates—of clearing the slate, so to speak. Such rates were the accumulation of years; the result of unremitting pressure; of conditions which seemed to justify them at the moment, and of poor judgment. The carriers, the shipping public and the commissions are now in a position to take each rate, or group of rates, put it on trial, and after the fullest investigation, reach conclusions based upon individual merit, and which will produce a rate structure fair to the carrier and profitable to the shipper. This is now in full swing and each day almost records readjustments to meet present conditions.

Those feeling the stress of injuriously high rates should realize that the factors governing the

level of freight rates are at work now, as always, and these will ultimately, and I believe rapidly, bring relief where and in the measure warranted, and to the extent that a freight rate adjustment can accomplish it. The traffic manager of a railroad or the regulatory commission is not the real rate maker. The conditions surrounding the production, movement and marketing of the traffic, make the rates, and the personal equation enters into the matter only insofar as it is necessary that expert judgment tell us what these conditions spell.

All other considerations aside, a freight rate simply must be one which will lay the traffic down at the point of consumption at a figure returning a profit to the shipper. Any other adjustment would be suicidal to the transportation interests. It is self evident that a rate can be neither prohibitive nor unduly restrictive to a maximum distribution without affecting their income as vitally as that of the producer. The carrier is interested only in moving products from the point of production to the point of consumption and this must be done at a profit to the shipper or there will be no traffic to move. This, of course, cannot be carried so far that with every change in the labor market, or the price of containers or raw material reflecting the cost of production, or with every fluctuation in selling prices brought about through crop shortage or other reasons, the freight rate must follow up or down, but where conditions are not transitory, are definitely and reasonably permanent, the transportation charge must be adjusted accordingly. Nor can we expect that the natural rules of rate making will protect those locating factories at geographically ill-chosen points irrespective of their source of supply for raw materials or their natural distributing territory.

Illustration in Fruit Industry

An illustration can be offered in the precarious situation of the California green fruit industry. The eastbound transcontinental rate has been advanced since 1917 from \$1.15 per 100 lb. to \$1.44 and again to \$1.92 per 100 lb. The first advance was absorbed by increased prices, which is true also to some extent of the second increase insofar as the season of 1920 is concerned. That year showed prices at the peak. The season of 1921 witnessed a material price drop, in some instances actually resulting in red ink to the shipper, and the opinion prevails that prices will be still lower. The industry is faced this year with a strong probability of approximately prewar prices on the one hand and on the other with production costs on a higher basis than 1917 and the freight rate 167% of that in effect in 1917. Take

also into consideration a large increased acreage, as is evidenced by nursery stock sales, and it would seem to be time for a revision of the rate downward before real harm is done. A substantiation of the facts should find the carriers in full accord with the growers and shippers on this, as they can no more afford, than can the grower, the crippling of an industry representing over 100,000 carloads annually.

Effect of Water Routes

Another and important element acting as a governor of freight rates is that of competition—not in the sense that competition exists as between rail lines or between water lines in the amount of the charge, for that is of the past, but competition in that respect does exist between separate methods of transportation, water vs. rail, principally because of lower operating costs of the former. The Pacific Coast is fortunate in that the Panama Canal will always exercise a certain control over the rate situation. The steamer lines through the canal contribute to lower rates than would otherwise be obtainable in that they can and do, with a reasonable return, handle what is known as dead freight between Pacific ports and Gulf and Atlantic ports at a differential under rail rates—practically their only disadvantage is that of time—about 28 days by water, as against approximately 14 days by rail. They can reach into the interior from the Pacific port or from the Atlantic port, and up the Mississippi River from a Gulf port, or indeed reach into the interior on the identical shipment at both ends. In these cases, however, they are handicapped not only in the matter of time, increasingly so as their point of origin or destination or both may be distant from the port, but also in the matter of transshipment, involving possible loss or damage and the fact that a local freight rate must be paid by the shipper at one or both ends. Their territory is therefore restricted to the extent that the differential under rail rates is equal to the task of absorbing the local rate or rates and still show a saving to the

shipper. Paper may be shipped from Maine to an Atlantic port, thence trans-shipped to San Francisco; dried fruit may be shipped from the Santa Clara valley to San Francisco, thence by steamer to an Atlantic port and there forwarded to an adjacent interior point, all at a saving as compared with the all rail rates—but dried fruits cannot be moved from Fresno to San Francisco, thence by water to New York and result in a saving sufficiently large, everything considered, to be attractive.

Possibilities in Shipment by Water

The possibilities of the water route are not confined to "dead" freight. Perishable commodities, such as apples and oranges, particularly the former, are today moved in refrigerator ships to Atlantic and European destinations. The citrus fruit people in pooling their members found 55 per cent of the growers favorable to Canal movement and are building steamers for this purpose. The deciduous fruit interests might to their benefit use water transportation, although it has two serious objections—a full steamer cargo arriving at, say, New York simultaneously with a large number of cars by rail would break the market. This could be obviated by intelligent distribution through the cooperative organization operating in California and by light cargo refrigerator ships. As to the further objection, that of initial handling from the interior of the ship, certainly with our splendid highways, automotive service, the best of care, equipment and facilities, we should handle this delicate crop without material loss. It does not follow that the rail lines will always follow the water rates, even at a higher level. They have intermediate traffic which cannot be touched by the steamer lines, to protect against loss in revenue, but the outstanding fact remains that the advantages of the service through the Panama Canal are such as to secure a large volume of freight, that potentially the Canal is available to even larger use, and will stand as an insurance against unreasonable rail exactions.



The success of the first direct shipment of oranges from California to Europe and of experimental shipments to the Atlantic Coast by way of the Panama Canal during 1921, has resulted in the construction of special refrigerated vessels which will handle a part of future shipments.

Should the Pacific Coast Expect a Severe Depression in 1923?

Walter V. Woehlke, Managing Editor of *Sunset*, Replies to Roger Babson's Statement that the Pacific Coast Should Make Preparation for a Considerable Decline During the Coming Year

IN view of the fact that Roger W. Babson, president of Babson's Statistical Organization, is reported to have predicted that the Pacific Coast is due for a severe depression in 1923, the following extracts from a letter from Mr. Babson to the editor of the *Journal of Electricity and Western Industry* are of considerable interest.

"The present period of business depression originated in January, 1920, in the industrial centers of New England and radiated to other parts of the compass, gradually spreading toward the South, the West and Canada. This is the typical path of a business disturbance and has applied not merely to the present reaction, but to all previous periods of depression for which we have records.

"This means that the Pacific Coast does not ordinarily experience deflation until two years or more after the disturbance has first appeared in the Northeast. A study of business records shows that thus far the depression has run true to form. We anticipate that the Pacific Coast will not be immune to a depression, and that a reaction in this section of the country has merely been postponed. During the coming year we look for the development of considerable decline in the Pacific Coast region, especially toward the south of this district, a locality which heretofore has held up remarkably well. It is true, of course, that many parts of the Pacific Coast did not profit by the war activities and the post war boom to such an extent as certain cities in the East. To this degree, therefore, the decline may be modernized in accordance with the law of equal and opposite reaction.

"But even making due allowance for such a tendency we still feel that all business men with interests on the Pacific Coast should be prepared for an appreciable slowing up of business. We have already mentioned the fact that a business depression tends to move in a southerly direction. This has been illustrated on the Pacific Coast by the fact that the localities toward the north have already experienced a considerable drop. These localities towards the north have taken their medicine, so to speak, and therefore their outlook is relatively good as compared to the southern parts of the Pacific Coast. Lumber, the basic industry of the Pacific Northwest, also promises increasing activity beginning with the spring of 1922. More equitable freight rates to the East and large unfulfilled demand for residential building and continued export trade with the Orient should result in increasing activity in the various branches of the lumber industry. During 1922 there is likely to be improving markets in Washington and Oregon, but as you move toward the South the prospects become increasingly unfavorable."

The point of view of a western authority, who disagrees thoroughly with Mr. Babson's statements, is expressed in excerpts from a letter by Mr. Walter V. Woehlke, Managing Editor of *Sunset*.

"California particularly and the Pacific Coast as a whole did not during the last year suffer as much as the East or Middle West on account of their peculiar position. And this peculiar position will continue to keep the business conditions and the purchasing power of the Pacific Coast above the average of the country.

"In the first place, there is no large scale industry on the Pacific Coast which has suffered through the decline of its markets. There are hundreds of jobbing and specialty shops which continue to do a fair amount of business, and there is a sizable number of real factories supplying only the local market which, as you know, has not declined in the same ratio as the markets in the rest of the country.

"Aside from the comparatively small amount of manufacturing, the principal activities of the Pacific Coast are first, agriculture, second, mining, third, lumbering. The Middle West is down and out, principally because its staple prod-

ucts, such as corn, oats, rye and wheat are selling at pre-war prices or below, whereas the cost of production and transportation has not been reduced in the same degree.

"On the Pacific Coast these staples do not dominate agriculture. The farming industry is extremely diversified, and the value of the fruit crop far overshadows the value of the cereals produced. In 1920 and 1921 when the agricultural staples everywhere hit rock bottom, fruit prices remained at a fairly high level. During the war the fruit-eating habit became firmly established, cooperative marketing organizations have become perfected and there is no reason to believe that this year or next year there will be a material decline in the receipts of the far western fruit growers. California's walnut crop, for instance, was entirely disposed of within four months after the harvest at the price fixed by the Association.

"The orange producers are in good shape; raisin and wine grape producers have made startling profits; the prune and apricot growers have disposed of the 1920 surplus and the 1921 crop is moving into consumption at a price that leaves the growers a profit. I might continue the recital, but the conditions described apply to horticulture in general throughout the territory. The only weak spot that may develop this year and next is in the apple regions. There production has reached such a high level that the growers must depend upon great prosperity in the East or upon the failure of the eastern apple crop, an event which occurred last season.

"The two weak spots in the agriculture of the Far West are hay and livestock. Prices of alfalfa hay have been very unsatisfactory, but this situation is remedying itself gradually through the increase in the dairy herds and through the beginning of a movement of alfalfa hay from the Pacific Coast to the Atlantic Coast via the Panama Canal.

"The livestock industry was very hard hit. Because of the blow it sustained two years ago, it is now on the point of recovery. The forced liquidation compelled the producers to reduce their herds drastically, to sell even a part of the breeding stock, until today the remaining herds are hardly able to keep up the supply. The slightest improvement in the demand will raise the price and put the industry on its feet again.

"About lumbering: In 1922 building activities will be greater than they were in 1921. All of which means that the western mills will be called upon for a greater lumber output. It should also be remembered that the southern supply of yellow pine, principal competitor of the far western lumber, is diminishing constantly, and that with this shrinking the price of western lumber must either remain stationary or go up.

"The third of the basic far western industries is mining. Owing to the decreasing cost of labor and material, gold mining is now on the upgrade for the first time in five years. By June of this year at the present rate of curtailed consumption the last pound of the surplus copper now available will be used up. In the meantime, eighty per cent of the far western copper industry has been shut down absolutely. It is now reopening in part. In other words, the mining industry is so far down at present that it cannot grow anywhere except up.

"On the basis of these facts, all easily corroborated, it is impossible to figure out how depression can hit the Pacific Coast, the Far West and California while the rest of the country improves.

"After all, our prosperity is based upon our ability to produce goods for sale in the Middle West and the East. During the time when our principal markets were in the worst shape since 1893, we managed to retain a higher degree of prosperity than the rest of the country. Would you say that we would sink deeper into the mire when our markets begin to mend and to call for more of our products?"

Western Power Companies Push Electric Range Campaigns

Nine Electric Range Campaigns Now Under Way in the Western States, with Four Planned for the Near Future, According to Survey Made by Journal of Electricity and Western Industry

OVER thirty thousand electric ranges were reported on the lines of forty of the western power companies, according to a survey just completed by the Journal of Electricity and Western Industry. This represents a load of 162,535.5 kw. and a monthly return to the power companies of approximately \$140,000. Of these figures, data on 23,273 ranges were reported by 26 power companies representing conditions on their lines in January, 1922. Where no up-to-date information was obtained from the company, but 1919 figures were available, a factor of 85 per cent increase was applied to the number of ranges on the company's lines and to the kilowatt load and these figures used, as indicated in the table. This factor was obtained by averaging the percentage increase of seven companies in this territory for which both 1919 and 1922 figures were available. Figures from the 1919 data were also given for the average capacity of the ranges, average consumption and average monthly bill, and have been added to the table largely from the standpoint of their interest in showing that the average size of range installed has increased in the two years from 4.38 to 5.5 kw. and the kilowatt-hour consumption from 142 kw-hr. to 179 kw-hr.

Interesting information was obtained from the power companies on past and present policies in regard to the pushing of ranges. From these replies, it appears that out of 26 companies, eight are now carrying on active range campaigns and four announce campaigns for the near future. Of the remaining companies not pushing ranges, two are now offering special rates on ranges, although they are not pressing their sale by special advertising or

soliciting, one is selling at list, but installs free of charge, and one company is carrying some advertising and displaying ranges in its offices, but is pushing their sale only through contractor-dealers. Three companies express dissatisfaction with present prices, but state that they will be glad to push the sale of these appliances when they are listed more attractively. One company states that it is prepared to urge the sale of this appliance only if it is allowed more attractive rates.

Eleven of the companies, including practically all those which now have the largest blocks of ranges on their lines, state that at some time during the period since 1915 they have conducted special range campaigns. Of these nine companies report selling below list, the campaigns resulting in placing 4,800 ranges upon their lines. Two companies sold at list, making a full charge for installation. These report 127 ranges placed upon their lines. Of those selling below list, three quoted the appliance at the list price, but included in this the charge for installation. All others offered special prices for the range, varying from 10 per cent below list to cost price. The charge for installation differed. Five of the companies either charged the full price for installation, or left it to the electrical contractor to install at his own price. One made a special price on the installation, one installed at cost to the power company, and one installed free of charge. This last instance was that of the city of Seattle which made a special feature of selling one carload of ranges at cost, installing them free of charge.

All companies conducting range campaigns at the present time sell on terms which are in effect

DATA ON ELECTRIC RANGES AND WATER HEATERS REPORTED BY FORTY-ONE WESTERN POWER COMPANIES

	Number Com- panies Reporting	Number Consum- ers	Number Ranges on Lines	Total Kw. Range Load	Average Kw. per Range	Average Kw-hr. per Range per Month	Average Monthly Bill per Range	Effective Rate per Kw-hr.	Number Water Heaters on Lines	Number Com- panies Now Pushing Ranges	Number Com- panies Planning Future Campaigns
California.....	10 * 1	665,379 4,000	7,973 72	49,225 277	6.2 3.9	155 200	\$5.31 6.00	\$3.43 3.00	3,619	4 ..	2 ..
Oregon.....	2 * 5	62,426 29,600	1,580 1,117	9,080 4,891	5.74 4.3	141 110	4.90 3.30	3.47 3.30	75	2..	....
Washington.....	5 * 1	153,792 852	8,772 74	49,624 259	5.64 4	235 122	4.60 3.66	1.96 3.00	4,679	2 ..	1 ..
Colorado.....	2 * 2	70,701 1,512	89 222	494 906	5.55 4.8	166 119	7.89 4.90	4.75 4.12	........	....	....
Utah.....	1 * 1	1,275 49,863	112 2,908	670 11,038	6 3.8	197.4 159	3.60 3.57	1.82 2.25	20....	....	....
Idaho.....	3	43,098	4,583	18,115	3.95	129	3.16	2.45	3,369	..	..
Montana.....	1 * 4	5,000 30,684	130 3,307	780 15,031	6 4.54	125 125	.... 3.10	.... 3.10	35	1..	....
Nevada.....	* 1	5,131	148	925	6.25	100	3.15	3.15	....	..	..
Arizona.....	2	1,800	34	200	5.29	180	4.50	2.50	79	..	1
Total Reporting.....	26	1,004,471	23,273	128,188	5.5	179	\$4.55	\$2.54	11,876	9	4
Estimated from 1919 figures.....	*15	121,522	7,842	34,347	4.38	142	3.98	2.80	....	..	..
Total.....	41	1,125,993	31,115	162,535	5.33	176	\$4.49	\$2.55	....	..	..

*Figures in lines so indicated represent 1919 figures of companies for which 1922 data was not available, except in the columns "Number Ranges on Lines" and "Total Kw. Range Load," where an 85 per cent increase has been assumed. This percentage was obtained from an average of the growth shown by seven companies for which figures were available for both years.

below list. These terms vary from a flat price for range and installation, to a list price quoted, with a marked discount for cash payment. Most of them, however, charge the full price for installation or turn it over to the contractor-dealer, making the reduction to the customer in the quoted price of the range. An idea of the various types of prices may be gained from the practices of the following companies:

Idaho Power Company.....	Ranges at list, with 10% off for cash. Installation left to contractor-dealer.
City of Tacoma.....	Ranges 25% below list. Installation left to contractor-dealer.
City of Seattle.....	Ranges 15% below list. Installation—allow \$75 exclusive of transformers.
Northwestern Elec. Co.....	Ranges 10% below list. Customer stands cost of inside connections.
Portland Ry. Lgt. & Pr.....	Ranges 15% above cost. Installation costs added.
San Diego Consolidated Gas and Electric Co.....	Ranges 10% below list. Installation at cost.
Western States Gas and Electric Co.	Ranges and installation at flat price.
Pacific Gas and Electric Company	Ranges (where installed by the company) 40% above cost less 10% for cash. Installation \$60 flat rate.
Great Western Pwr. Co.....	Ranges at cost. Installation borne by the consumer.

Of the companies which state that they are now pushing ranges, seven sell ranges at list price, two at prices below list and seven leave the entire question of ranges to the contractor-dealer.

Figures of particular interest are those on water heaters. Of the power companies reporting, all who were pushing ranges also encouraged the sale of water heaters. Apparently at the present time there is represented on power company lines an average of one water heater to every two ranges.

There was very general approval of the use of the double throw switch with water heater installations, although replies on this subject were not complete enough to tabulate. Both flat and meter rates were reported, with a tendency to abandon the flat rate system expressed by two of the power companies reporting.

In reply to the question, "What type of water heater do you encourage?" 5 companies expressed approval of the Clamp-on type, 17 of the circulating type, 6 of the storage type, 5 of the continuous type and 3 of the demand type. Several of the companies accepted all types of heaters. Of those expressing preference, the circulating type was commended by all but one company which specialized in Clamp-on heaters.

In general, it may be seen that there is considerable activity in the line of both ranges and water heaters in the West at the present time. On the other hand, there is apparently some feeling that the present price of ranges is too high to prove attractive to customers, expressed both in the campaigns quoting ranges below list price and in the hesitancy of some companies to press this equipment until prices shall be somewhat lower.

"Natural Steam" Plant Is Proposed at The Geysers in California

PRELIMINARY work is well under way at The Geysers, about 75 miles north of San Francisco, California, on a project for developing power with the steam which is continually escaping from the earth there. The development proposed would be similar to that at the Larderello installation in Italy that has been using heat from the earth to operate a steam turbine plant for a number of years. Proponents of the California project are advising with the engineers who installed the Italian plant, particularly with reference to the means of eliminating corrosive gases.

Preliminary work at The Geysers has included the driving of several wells to determine temperatures, pressures and quantities. In the district being explored temperatures ranging up to 350 deg. F. are found in many places at the surface over an area about one-half mile square and it is believed that these temperatures increase very materially below ground. With these temperatures water that becomes imprisoned beneath the earth surface is transformed into steam with explosive violence. With the casing open and clear at the top, water put down the well in just the right quantities comes back in the form of steam shooting out under high pressure. By applying this method with caution, muck made by the churning of the drill can be blown out of the hole.

H₂S and other gases are encountered at The Geysers, but it is claimed that corrosion occurs only when metal is exposed to the gases in the open air. That is, the interiors of pipes carrying the vapor and pipes entirely buried in the earth are not affected. Both gaseous and liquid samples have been sent to Italy for analysis by the same methods applied at the Larderello plant. In the Italian development, drillings were made to depths up to 495 ft. to secure the temperatures required for the turbines. While at The Geysers the same temperatures are said to be found at depths of about 75 ft. The original method at the Italian plant was to use the steam as the source of heat for evaporating water which in turn was used in the turbine. Based on their later experience, however, the plant at The Geysers is to be arranged to use a gas filtering or purifying process so the live steam from the vent can be used directly in the turbine.

Should it prove feasible, after proper analyses have been made, it is planned to separate certain chemicals from the steam, this having proved practicable in the Italian installation at Larderello referred to above.

The present plan is to install first a small plant developing 300 to 500 kw. with which to supply power for further exploration and construction work. It is proposed then to install a much larger plant, possibly about 20,000 kw.

The project is in charge of J. D. Grant, The Geysers, Sonoma county, California.

The West Harvests Returns from Electrical Home Campaigns

Great Activity in Campaigns Directed Toward Increasing the Domestic Use of Electricity From All Parts of the West. California Survey Indicates Success of Early Home Electrical Displays

ELECTRICAL HOME campaign activities are being carried on in all districts of the West and plans are on foot for an even more thorough educative campaign during the coming year. Including the Denver home which is now almost ready for exhibit, six electrical homes have been completed and displayed during the past six months and definite plans are under way for seventeen more to be erected in Washington, Oregon, Utah, Colorado and California during 1922. With attendance at such exhibits running from 10,000 to 85,000, as has been indicated by electrical homes held in the past, it may be seen that during the coming year something like half a million people in the West will hear the story of the convenience outlet and the use of electricity in the home, in the most effective way that it can be told. During this same period something over \$160,000,000 will be spent in home building in the western states, according to estimates of the Twelfth Federal Reserve District.

How much of this expenditure will be turned into the channels of electric wiring and equipment over and above what would have been expended without these electrical home educational campaigns is indicated by the recent survey of building conditions which has been conducted in San Francisco and Los Angeles by representatives of the California Electrical Cooperative Campaign. This took the form of the inspection of homes, office buildings and hotels under construction, with a view to ascertaining how many convenience outlets were being installed. As a result of this survey, it has been stated that while no definite figures may be given for all construction, it is safe to say that 99 per cent of the homes now being constructed are electrified in the sense that they provide at least one convenience outlet for each room.

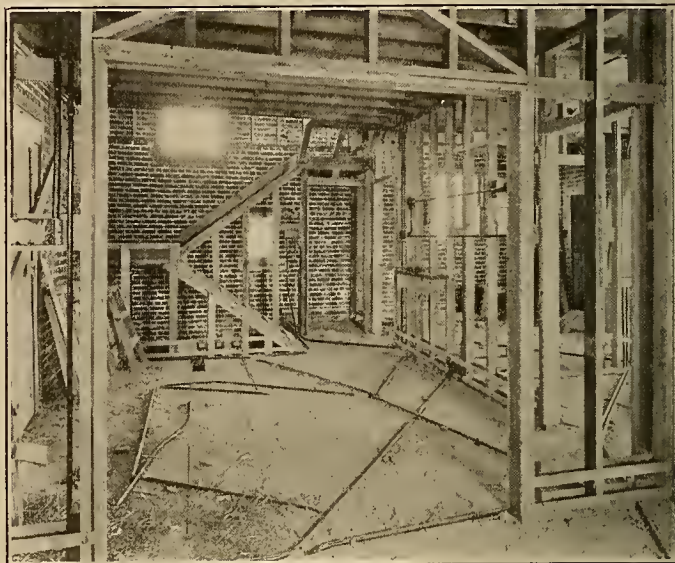
The investigation was not confined to high-priced homes, but included all types of construction jobs, the residences inspected having an average of $5\frac{1}{2}$ rooms. In the San Francisco bay district 120 homes under construction were examined, with the following encouraging results:

Average cost of each home.....	\$5,500
Average number of rooms per home.....	5.5
Average number of convenience outlets per home.....	6.2
Percentage of convenience outlets to total number of outlets in each home.....	17.66%

Of particular interest, was the widespread attention which had apparently been paid to the laundry. In ninety per cent of the homes examined, special laundry space was provided, with at least two convenience outlets for washer, mangle and iron.

Besides the homes inspected, a similar survey was conducted of office buildings. Sixteen office buildings examined showed a minimum of two and a maximum of four convenience outlets per room.

The general adoption of the electrical idea in hotels and apartments is to be seen in the tendency to feature electric facilities in advertising such establishments. One new hotel in Los Angeles with 450 rooms shows a total of 960 convenience outlets. An Oakland apartment house now under construction at



The wiring layout for a typical electrical home is well shown by this construction view of the Denver home, scheduled to open early in March.

a cost of \$1,000,000 and one of a chain of similar apartments to be built in this vicinity, is to have 40 apartments of five rooms each, which are to rent at a minimum of \$125 per month. Each apartment is to be provided with 10 convenience outlets, 3 in the living room, 2 in each bedroom, 2 in the dining room and 1 in the kitchen. Besides this, there is provided a completely electrified laundry, servants' quarters and a service garage, which is to cost \$35,000.

The Los Angeles survey has not been completed, but a progress report indicates that figures will confirm the results of the San Francisco investigation. Reports from architects and builders from elsewhere in the state show that the same influence has been felt throughout the state and that the effect of the electrical homes which have been staged during the past year may be said to be state-wide.

The figures are a striking tribute to the value of such exhibitions. Not the least of the effect of the demonstrations has been the education of the electrical industry itself and its consequent united efforts in following up these campaigns. Electrical wiring pamphlets, follow-up publicity and a more general emphasis upon the convenience outlet have done much in making effective the message originally told by the electrical home. Through these efforts it may be said that the wiring appropriation for the average home in California has at least doubled.

Progress of Industry Handicapped by Lack of Engineers

In the Concluding Article of a Series of Three, Mr. Leury Describes the Effect on the Electrical Industry of the Absence of Trained Industrial Electrical Engineers in Manufacturing Plants

By LOUIS F. LEUREY
Electrical Engineer

IN two preceding articles the writer has attempted to picture the condition of electrical usage in industry as it actually exists, without exaggeration and without any attempt to palliate these conditions. He has tried to show that the fundamental weakness in the industry consists of a faulty distribution of engineering personnel by which practically all of the trained electrical engineers are found in the ranks of the power companies, manufacturers, and jobbers, and practically none on the side of the user. He has tried further to show that this condition has robbed the user of his creative instinct and has resulted in a number of major abuses which have cost the users great sums and have retarded the extension of electrical usage which would have benefited the entire industry. It cannot be disputed that any part of a factory process or equipment will yield a return in proportion to the amount of competent thought and effort which is expended in its installation. These articles seek to show that such thought and effort applied to the industrial application of electricity can only be efficiently employed through the agency of trained industrial electrical engineers in the direct employ of the larger manufacturing companies, or by practicing industrial electrical engineers who can best serve groups of the smaller companies. These men will develop to a much higher degree of efficiency the operating electricians who are now serving the plants and will act as effective interpreters of the special needs of each industry to the electrical industry as a whole. When this desirable condition is achieved, then, and only then, will the factory owner be safeguarded in his investment and the electrical industry see the amplification of electrical usage that it so much desires.

But before any advance can be made the major groups within the electrical industry must become convinced of the fact that shameful conditions exist and the will to correct these conditions must be stimulated. The writer does not believe that this desirable advance can be made unless it be done strictly from an economic basis. Like Mr. Emory Wishon, he is a believer in the doctrine that the intelligent self interest of each branch of the industry must be first aroused and he will endeavor to show briefly in what measure this self interest exists.

As usual, from its very broad point of view, the press has been ahead of all other branches of the industry. The McGraw-Hill publications, in particular, have been preaching with regularity in their editorial columns the necessity for industrial electrical engineering within the factory. Many advanced types of industrial electrical practice evolved by trained industrial electrical engineers have been

described in their columns. The press will have to continue this good work because in a peculiar manner its prosperity depends on new and efficient applications of electricity.

The Power Company

The power companies would, without question, welcome the advent of trained industrial electrical engineers because in numerous ways it would be to them a direct economic advantage. With the accurate knowledge of factory conditions possessed by such engineers, the power company would be assured of a minimum investment in transformer and substation equipment and fullest cooperation in such important matters as maximum demand, voltage regulations and power factor. In addition to these advantages on the engineering side, there would be further and very material advantages from the commercial side. It will be accepted, I am sure, as axiomatic that a plant, all of whose elements are thoroughly coordinated, will be a more consistent and a larger consumer of electrical energy than one of the haphazard type. It has been the writer's direct experience that the satisfied owners of well-designed industrial electrical equipments are continually seeking to extend the field of electricity in their factories. Another angle to the commercial situation which is a constant source of annoyance to the power companies and one which in the aggregate, causes them to spend needlessly many thousands of dollars, is the misunderstanding by the customer of his bill or of some condition of his service. In probably 90 per cent or more of the cases the customer has but an imaginary grievance.

The Manufacturer and Jobber

Ask the manufacturer to tell you how much it is costing him to serve electricians or master mechanics who have insufficient knowledge, and who are constantly swayed first to one side and then the other by the breeze of every competing argument. Ask him again to tell you what it costs to sell his equipment to a purchasing agent who is necessarily non-technical and to whom the requisition comes as a cold piece of paper. The writer has known of case after case where untrained men, in trying to arrive at the solution of a problem, would have a salesman from every jobber in the district furnish hours of his time and columns of figures. How different is the contact of these salesmen with a trained engineer and what a world of effort is saved, and how greatly it reduces the problem of returned merchandise!

But, the best of all, the manufacturer could eliminate the cost of competition with devices so evidently deficient in design or quality that a technical man would eliminate them from consideration

at first view. Thousands of dollars per year in unnecessary costs are borne by each manufacturer or jobber due to this practice and to the exchange of goods that could be obviated by proper technical assistance given at the factory and to the purchasing agent.

The Contractor-Dealer

Here is one man above all that suffers most for conditions not of his own creating. He has to bid on specifications drawn by amateurs, which tell him how to refine copper at Bayonne, N. J., but do not tell him anything of the job in hand. Specifications drawn for a San Francisco industrial plant could be used without change in the wiring of a Kimberley diamond mine. Hiding behind such phrases as "The code shall govern," they force the contractor to be the goat of any eventuality. If the contractor puts on a sufficient margin to legitimately protect himself against an ignorant specification, he may lose the job to a "curbstoner," and if he gets the job, the owner has paid two fees for design and gets nothing from either. Where the contractor does the work without plans or specifications, he often very innocently "gets in wrong" with the owner. The owner instructs him from day to day to add this motor and that switch until the day of settlement arrives, and often blames the contractor for cost of work which has been well and economically done but which has never been planned or budgeted.

It is almost needless to say that the most effective ally that these commissions could have in the factory would be the industrial electrical engineer. These regulatory bodies feel that where competent electrical engineers are employed they can forget that particular industry and concentrate on others where they are more needed. A well distributed group of industrial electrical engineers throughout the West would lighten the field inspection work of these bodies and allow them to concentrate on the more important research work and statistical work which guides the whole movement.

What Remedy Can the Industry Apply?

In the above paragraphs the writer has tried to show how these groups, as well as the industry in general, in addition to specific losses suffer a still greater potential loss through the failure to rapidly extend the field of electrical usage. It would seem to be sound business sense on the part of these groups and of the industry in general to set about immediately to correct this condition as fast as circumstances would permit. The electrical industry, functioning through the technical press and through the Cooperative Campaign bureaus, is spending thousands of dollars to promote the adequate use of electricity in the lighting field. Is it the logical thing that it should spend none in the still greater fields of industrial motor drive, industrial heating, and the other applications of electricity as a medium in industry? If it is impracticable for individual companies alone to properly introduce good lighting methods to the public, it is equally impracticable for individual companies alone to introduce better industrial methods under present conditions. The indus-

try cannot properly advance until an intelligent agency can be developed which has the confidence of the manufacturing industry on one side and the confidence of the electrical industry on the other, and which can properly interpret each to the other.

If this be so, let the electrical industry as a whole function through its press, its regulatory bodies and through each individual member, using its cooperative funds to start a campaign of publicity and education among the factory owners which will show them the necessity for trained industrial electrical engineers within the factory, to the end that mutual understanding and good will will promote the common good of the electrical as well as all other industries. Manufacturers' representatives have told the writer that while they recognize the necessity of trained industrial electrical engineers in the industry, they did not know where to turn to locate such men. The truth of the matter is that under the existing order of things, with every other branch of the industry furnishing the owner unlimited engineering without charge, and furnishing him with a degree of service out of all proportion to the necessities of the case, it has not been possible until recently for the industrial electrical engineer to survive. With the growth in magnitude and importance of western industrial establishments, the very size and complication of the electrical problems has forced some of the larger manufacturers to employ or retain trained industrial electrical engineers. In the East, a great number of able men are represented in this profession, both employed by the manufacturers and in private practice, and I feel sure it is no exaggeration to say that the greater advances in factory electrification which have been made in the East are due, in a large measure, to the direct contribution of these men.

Here is a chance for our western educational institutions to throw the weight of their influence into the breach and serve the double purpose of promoting the art of engineering and the economic well-being of their graduates. From a superficial viewpoint, the writer cannot conceive of a more discouraging outlook than is faced by the graduate in electrical engineering from our universities. With the great interconnections and consolidation of power supply companies, where does the electrical graduate turn for employment? In civil and mechanical engineering, hundreds of these young men go forth into the diversified fields of manufacture, transportation, shipping, and agriculture—but no such fields await the electrical graduate. Would it not be well for the universities to study the application of electricity in industry as a potential and important field for the electrical engineering student?

In conclusion, the writer feels that in the existing industrial applications of electricity there is a great national waste, but a waste that can be easily and successfully attacked. The responsibility of the electrical industry for these conditions is clear and cannot be shirked. When the industry squarely faces this problem, no time will be lost in applying correctives which are so obviously at hand.

A FEW IDEALS TO SHOOT AT

IN an effort to bring about a unity of effort in all sections of the nation, the editors of the Journal of Electricity and Western Industry and Electrical Merchandising have agreed upon the following ideals as basic in the electrical industry. We offer them as sensible suggestions for commercial policies which should be advocated by electrical men of every class and established gradually as standards for us all.

1. That electrical men more generally must come to recognize the great and unparalleled opportunities for service to mankind which electricity affords in its manifold and increasing applications,—in factories, construction work, transportation, shops, stores, offices and homes,—and that "to get more people to use more electricity in more useful ways," is an obligation which devolves upon every electrical man, as his responsibility to the public and to the electrical industry.

2. That all electrical men should themselves use electrical appliances and live in electrical homes as a continuous living demonstration in their communities, of the comfort and economy of "doing it electrically."

3. That the local electrical family in every community should organize and harmonize its interests, purposes and policies so that the public will see electrical men agreed on principles and working together in friendly cooperation.

4. That the electrical business, in order to secure successful men must offer prosperity in generous measure by paying salaries and offering participation in profits sufficient to attract men of brains and ability, in open competition with other lines of business.

5. That electrical men of all branches of the industry should invest a portion of their savings in electrical business enterprises.

6. That the electrical industry through a joint commission of retailers and jobbers and manufacturers should make a thorough survey of methods and costs in the distribution of domestic electrical appliances, in order to discover where wastes in such distribution occur, what they cost, what wastes can be prevented and how, and to provide a sound foundation of facts on which to determine what are fair margins for any and all distributing agencies between producer and consumer.

7. That every electrical business concern should know its costs, both for the protection of its own prosperity and its obligations to the trade of which it is a member.

8. That one voltage, one frequency, and one kind of current, should be made a universal standard for commercial and residence service in all communities, as fast as existing systems permit, and that immediate steps be taken to agree on such a standard,—possibly 110 volts, 60-cycle alternating current.

9. That the generating and distributing of electricity is the prime function of the central station, and that no secondary activity should be engaged in that jeopardizes this main objective. The central station, however, should recognize its responsibility in the development of the local market for energy using appliances and should make its salesroom headquarters for all appliances and a friendly, sympathetic pace-maker for all dealers in the intensive selling of electrical appliances.

10. That electric public service companies should sell their securities, widely distributed, among their local public, so that the people of each community will feel a personal interest in its utilities companies and an obligation to treat them fairly.

11. That all light and power rate schedules and contracts should be simplified and humanized and be so expressed that the customer will no longer be bewildered and offended.

12. That central stations should, where practicable, discontinue the practice of requiring a deposit before consenting to supply current to a new customer.

13. That, in order that the public may understand their electric bills more clearly, steps be started to have all house meters read directly in figures to indicate the kilowatt-hours consumed, or even in dollars and cents, with a "trip tally" to give the month's consumption, as well as a tallying of the grand total.

14. That residential meters should preferably be installed in protected positions outside the house or apartment so that the meter reader need not enter the house, the expense of return calls may be avoided, the customers may be saved annoyance, and good-will for the public service industry may be promoted.

15. That central stations should not disconnect residences when vacated, so that electric service may be immediately available upon the re-occupation of the house.

16. That all appliances sold by central stations, except during pioneering periods, should be sold at a merchandising profit and all repair jobs be done at a profit so that the sales department, carrying its proper share of overhead expense, may pay a profit to the stockholder on the business it has done, at the same time avoiding destructive competition with others in the industry.

17. That in cases where the central station does a merchandising business its salesroom should be equipped and organized as a real store, to do a straightforward merchandising business that will serve as a pattern, guide and stimulus to other local

stores selling electrical appliances, in order that the greatest possible number of appliances shall be sold, no matter who sells them.

18. That the man in charge of the business side of a central station should be made responsible for all contacts and relations with the public, including not only selling and advertising, but inspection and trouble service to the customer, the sale of company securities to the public, and all the civic activities and trade relations of the company, concentrating this entire authority in a man big enough to function in this larger way.

19. That the central station commercial executive be regarded as occupying the position of sales promoter and friendly adviser for the entire local electrical selling family, charged with promoting the business success of each and all of the local concerns, and in this way promoting the company's business. Lists of electricity users and appliance owners should be shared by the central station with local dealers, to promote the sale of appliances. Central station advertising should list names and addresses of all local dealers as well as the company's own electric shop. It is to the central station's interest to foster and encourage all possible retail sales by any retail dealer in its community.

20. That employees of central stations, manufacturers, jobbers and dealers should be assisted to equip their homes electrically by permitting them to purchase and pay for equipment by installment deductions from their salaries so that each electrical man's home may become an example to the neighborhood in which he lives.

21. That the central station, in so far as practicable, should make its lighting and power bills payable at neighborhood electrical dealers' stores.

22. That central stations should render a "Service of Correct Time" by some convenient means or signal—possibly dimming of the lights for an instant at 8 p.m. each evening to flash the correct time to the entire community.

23. That central stations should assume the leadership in their own territories in the effort to bring about the complete standardization of plugs on the basis of the attachment plug with the parallel blades, standardization of plugs at the appliance end of cords, and the standardization of other fittings, ratings and labelings that now confuse the public.

24. That in customers' installations all exposed parts of electrical circuits from which the layman is likely to get a shock, be covered up. This means the installation of safety switches, dead-front panels, dead-front receptacles, porcelain sockets and switches in damp places, insulators in pull chains, etc.

25. That the electrical trade think and practice "Quality Electrical Work," using quality materials. This means that owners, architects and builders must be shown the advantages of equipping houses throughout with "convenience outlets" and that their use be promoted by this name; that plugs and receptacles be standardized; that fuses and switches be properly labeled when installed, and fuse blocks be marked with proper sizes to be used; that dining room tables and other furniture where it provides convenience be wired for connecting appliances; that fixtures be equipped with standard-plug connections to provide interchangeability; that lighting outlets and switches be located with regard to the principles of good illumination and convenience; and that meter-boards be so located that meters can be read without entering the house.

26. That manufacturers' jobbers, central stations and dealers should apportion a percentage of their sales appropriations and effort to the development of markets for those appliances that still need pioneering and build them up to the point where they become staple merchandise.

27. That electrical manufacturers and jobbers should publish net prices and abandon the confusing system and wasteful expense of combining list prices and discounts.

28. That discounts in the chain from manufacturer to jobber to dealer be so adjusted that every man who has a function gets paid for it.

29. That manufacturers should extend the jobbers discount not for quantity purchases, but only to responsible organizations that perform the economic and service functions of a jobber.

30. That electrical jobbers should make a physical separation of wholesale and retail business,—where for local reasons it is not expedient to hang up the "Wholesale Only" sign and bend their energies exclusively to their function of distributing to the wholesale buyer and to stimulating the retailer to greater activity and more efficient methods.

31. That electrical contractor-dealers, jobbers and manufacturers should do their utmost to increase the popular appreciation of public utilities in general and upbuild confidence in the local central station.

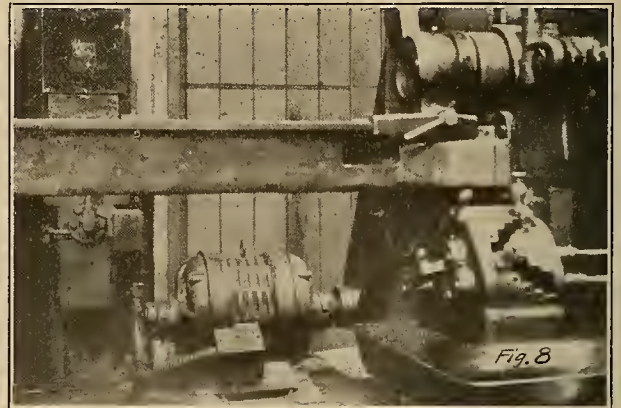
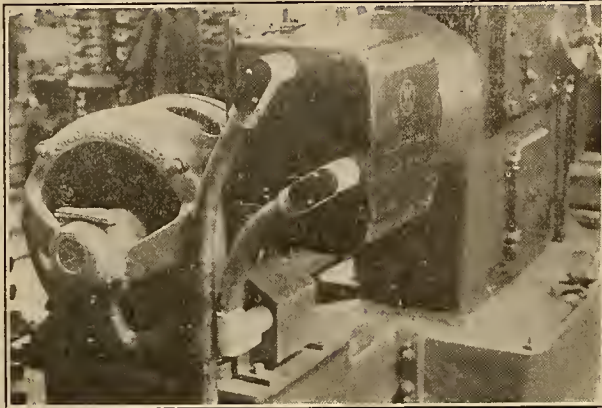
32. That association activities should be more closely coordinated to reduce the waste of duplication, and that the class thinking of the groups of electrical men represented by these associations should be more freely interchanged and harmonized.

33. That a careful study of present electrical-inspection functions be made to the end of revising or reshaping present inspection methods now sometimes charged as acting as a brake on progress in the art—and placing these responsibilities in the hands of men sympathetic with the aims of the electrical industry and appreciative of its coming development as a vast agency for the benefit of mankind.

34. That it is the duty of every electrical man to help influence his acquaintances and the public to use electricity and electrical devices that lighten the labor of the home, office, shop and factory, and to organize from time to time model "Home Electric" demonstrations, electric shows, home lighting exhibits, commercial lighting exhibits, industrial lighting exhibits, better lighting campaigns, "electrical weeks" and similar educational influences.

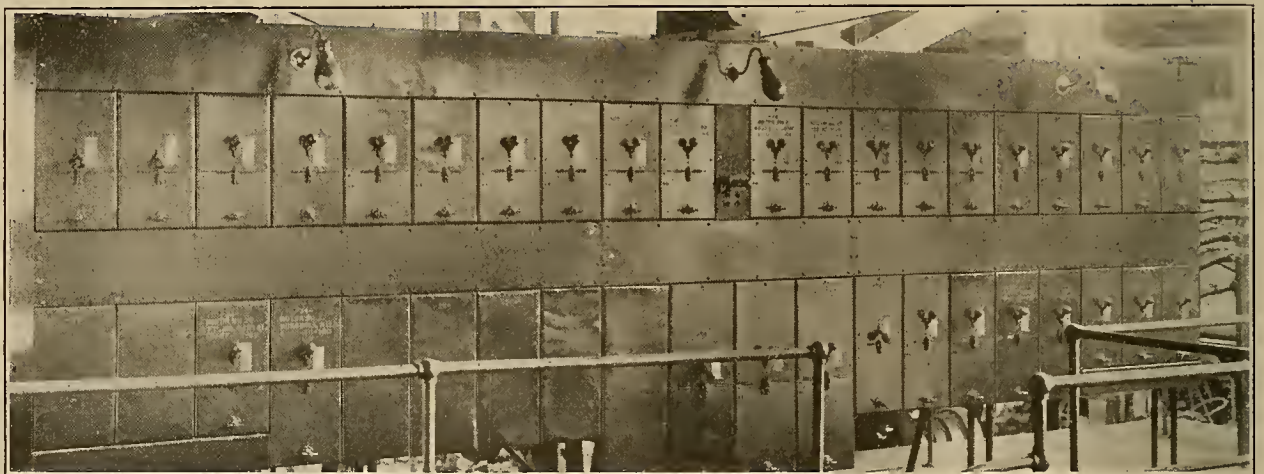
Factory Installation Combines Safety With Economy

One of a Pictorial Series Featuring Interesting Applications of Electric Service,
Advances in Home, Industrial and Power Construction and Noteworthy
Developments in Western Progress

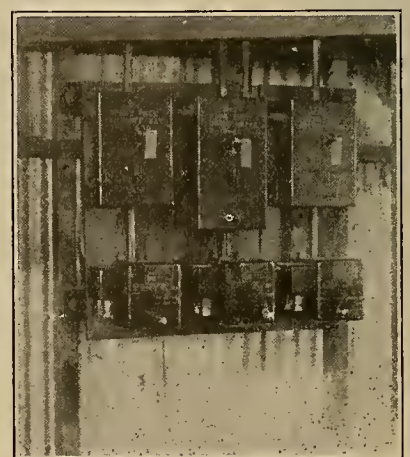
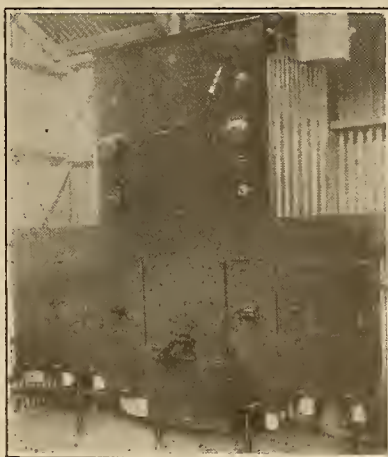


Special terminal boxes designed to fit each type of motor are a feature of the installation of the Bean Spray Pump Company of San Jose, California, which has been entirely reconstructed during the past year due to the plant's rapid growth.

From the starters the circuits are carried in rigid flexible conduit to the motors, thereby protecting the wires and grounding the motors and starters to the entire system. This arrangement provides safety and flexibility with a minimum of apparatus.



The machine shop switchboard above controls 29 motors and is the largest in the plant, being itself controlled by a 1,000-ampere main switch. This board is mounted on an elevated platform conveniently located near the center of distribution. It is built entirely of safety switches, arranged in two rows, with a set of buses and bus compartment for each row. The switches are grouped according to size; the largest being placed at the lower center.



Power enters the plant at 2,200 volts where it is transformed to 220 volts, metered and served to the main entrance on the central switch, shown above.

Auto-starters with self contained inverse-time-limit overload-relays and magnetic undervoltage release are used for the larger motors.

Motor controls are grouped at some points throughout the plant where a few small motors are operated within a short radius and a central control is desired.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

THE GOODS OFFERED FOR SALE

We have spoken of certain characteristics the salesman himself must possess, and among them were competency, enthusiasm, and truthfulness. How can a salesman be enthusiastic in his work? How can he have that confidence in himself which alone creates the impression of both truthfulness and competence, if he does not know in every intimate detail the goods he is selling? Have you noticed how lovingly the engineer uses the pronoun "she" when he speaks of the machine which has become a living thing to him? The machine is his tool and his sweetheart, just as is the vessel to the sailor—just as the article he sells must be to the true salesman.

This was not necessary during the crazy buying during the war and for some time after it, just as it is not essential for employees in self-serve stores. But the latter can hardly be classed as salespeople, and the blessed times of "order-taking" have gone, probably for years, perhaps never to return. Being salespeople yourselves, you all know what we call a "sales-talk." And of course, you know just as well as I do that it is only your knowledge of the goods you sell which can furnish you with the proper material from which to build your sales-talks. Generalized knowledge of your goods will never do, one cannot sell things today with general and vague assertions. The buyer demands facts about the goods, and rather definite facts, too. Unless you happen to be on the sales force of one of those large organizations which require their salespeople to take a full training course in selling their product, you will have to go after this knowledge yourself. Remember several points in this connection. First, it is true that you should know as much about your goods as you can learn. But remember that telling a customer all you know about your goods is not salesmanship. Salesmanship consists in telling the customer that which he wants to know about your goods. Second, never make the mistake in believing that the average buyer, particularly if he is a layman, sees everything he looks at, for he never does. Take a leaf out of the book of those extremely successful and efficient merchandizers, the mail order houses; look over one of their catalogs, and observe how they describe each listed article in the greatest detail, so that after reading the description the buyer has no chance whatever to have missed any of the valuable points or characteristics of the article. Use the same method when selling, and do not take any chances. Third, the better you carry your knowledge of your own goods in your head, the better an effect you will

produce on the buyer. It always irritates him to have the salesman hunt all over a catalog for prices or sizes.

The Market For Your Goods

People have a reason for buying a thing—they either need, or desire it—otherwise they would never buy it. It is up to you, if you want to sell successfully, to find out the various needs and desires which prompt or tempt people to buy the particular article you are selling. In the majority of cases, your prospect has not fully made up his mind to buy, and sometimes he has not even thought of buying at all. You must therefore be able to reinforce his desire, or to suggest it to him, and you can do so only if you know quite definitely how your product can and does satisfy human wants, needs and desires.

History of Your Product

Has it occurred to you that manufacturers and inventors are working all the time only on one problem; that all their efforts are directed only to one end; namely, to the satisfaction in an ever higher degree, of the multitudinous wants, of the endless desires of man? From the bronze beard-scraper of the time of Alexander the Great, to the clumsy iron razor of the middle ages, then to the unreliable early steel razors, to the high-grade razor blade of yesterday, to the first safety razors, and finally to the particular most modern, best perfected safety razor which you personally sell—this whole history of invention and perfection had but one aim—to satisfy the demand of man for a tool which would efficiently and comfortably remove hair from his face.

Hence to study in detail the history of the razor means to learn in detail the peculiarities of this desire of man. When you have done so you have learned how to make the prospective buyer understand quite clearly not only just what he wants when he looks for a razor, but also why your product is the one which will best satisfy his desire. To study the history of your goods means to learn the buying motives of the purchasers or users, and that is about as great an advantage to you as to know the hand your opponent holds in a game of cards.

Substitutes For Your Product

While studying the history of an article you will necessarily find out what similar articles have been used or invented for the purpose of satisfying the identical want or need of people. In studying the history of the electrical vacuum cleaner, for instance, you will learn all about the broom and the carpet sweeper; and you will also learn about the various types of vacuum cleaning—all-suction,

stationary-brush-and-suction, and mechanical-brush-and-suction. Only by learning all there is to know about the substitutes which people may use for your own product can you expect to compete successfully against these substitutes.

It ought to be quite clear to every salesman who wants to sell that he should know quite definitely just what the thing he sells will do and what it will not do. How many double-bed sheets will a "six-sheet" electrical washing machine actually wash without inconvenience? In learning about the performance of your product study its practical limitations, and be careful not to stretch the meanings of the words you use.

The Demand For Your Goods

The demand of people for your product depends mainly on what the product can do for them in satisfying their wants, desires, or needs. And I have already indicated to you how essential it is for you to be fully acquainted with these. But there is another angle to this question which a salesman seldom stops to consider, often to his detriment. When people know what they want and have the means to pay for it, and on top of that are willing to pay for the thing they want, we call this an effective demand. When a buyer comes into your store to buy an electric range, and is ready to pay the amount such a range would cost him, you are up against a job of strictly competitive selling. Here is where your knowledge of just what people expect and appreciate in an electric range will make or break your sale, other conditions being favorable. But suppose the buyer would like to get an electric range but is not willing to pay the price of one, or else that he does not want to take the required amount out of his pocket and hand it over to you right then and there. Here is where your knowledge of buying motives may bring about a sale notwithstanding the initial handicap in the demand. It is up to you in this case to show the prospect so many additional points of value in your product that in his estimation the satisfaction of his secondary wants, such as special comfort and extra conveniences, will overcome the initial handicap operating against your sale.

In many lines of salesmanship the source of best profit lies not in these relatively simple cases of recognized, conscious demand. It lies not in selling your range competitively with other ranges, but in selling primarily the idea of an electric range to people who have never felt the want of one, or the desire for one. We call this kind of demand "latent" demand. The possibility of a demand is there but it needs educational selling on your part to bring it out and to convert it into an effective demand. What do you think, for instance, of the electrical dealer who began selling washing machines to janitors of apartment houses of the two and three-room type, to be rented out by the janitor to the various tenants for a small fee each week? This dealer uncovered a latent demand, and enjoyed a free field for a long time before encountering belated competition, and by that time he was on the trail of another of these latent demands.

The Prospect For Your Goods

If you sit still in these days, and wait for the customer to hunt you up you run a good chance of landing in the poor-house. You have to go after your buyers, and go after them hard. But of course, running up and down city streets will not do at all in going after them. There are three effective ways for hunting up the elusive prospect in his lair; effective—provided you really go after him when you have discovered him.

Keep track of any direct leads which are given to you by your personal and business friends. Never leave your note book at home, because you may get such leads in the most unexpected places. Be eternally on the lookout for these direct leads—they are among your best sources of information. Remember carefully and all the time that every sale you make is at the same time a fertile source of possible direct leads of the most valuable kind. Do not hesitate to ask for such leads after a sale.

Mailing bureaus, city departments, club rosters, membership lists of various organizations—all these can be used in hunting for the potential buyer. Their ingenious use may prove very profitable to you.

But whether you use these or not, never forget to use the most important listing of prospects: the complete list of your own cash and credit customers. Here is where you capitalize heavily on the remembrance value of your own sales efforts, because every satisfied customer of yours is by that fact a half-sold prospective buyer of yours. I know that lists of credit customers are kept by every dealer in his accounts receivable ledger, but I have so rarely seen any attempt to keep a list of cash customers that I come reluctantly to the conclusion that the average dealer is really a kind of a rainbow chaser, neglecting that which is near and easy for that which is far and more difficult. If you have sold a man once and have satisfied him, why do you count against him the fact that he has paid cash on the spot? He will not, as a rule, refuse to give you his name and address for your list.

Six Years Experience With Convicts on Road Work in Northern California

In the six years since the first convict road camp was established in California, 1235 men have been sent from San Quentin prison to road construction camps located in remote districts in the northern part of the state. Out of this total 55 men escaped or attempted to escape and of these 35 men have been returned to the prison, and 20 are still at large. That is, 4.45 per cent of the convicts sent out on road work attempted to escape and 1.62 per cent were successful. A few months ago 2185 men were under commitment to the San Quentin prison and 252 of these, or 11.53 per cent, are assigned to one of the three road construction camps now operating in the northern part of the state.

J. A. Johnston, warden of the San Quentin prison, has expressed himself as being heartily in favor of the employment of prisoners on road work.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.
Ideas and Suggestions by Practical Men.

Preheating Boiler Feed Water Is Economical Practice

The heating of boiler feed water before it is fed to the boiler is an important factor in the economy of any steam generating plant.

In nearly all steam plants, even those running condensers, there is available for feed water heating purposes the exhaust from auxiliaries, which if not used will go to waste in the atmosphere. How many boiler users and engineers realize the vast amount of saving which might be effected with a small investment, an outlay for installation which will pay for itself over and over again?

Practically every steam plant under ordinary conditions has an abundant supply of exhaust steam available from feed pumps, etc., and there is hardly a more profitable use to which such exhaust can be put. This becomes evident when attention is called to the fact that the weight of exhaust steam required to raise the feed water temperature from 50 degrees to the boiling point, 212 degrees, varies from one-sixteenth to one-tenth that of the feed water.

In steam plants where the only units running noncondensing are the boiler feed pumps, which may not furnish sufficient quantities of "vapor fuel" to bring the feed water up to the desired temperature, it surely would be economy to run one or more vacuum or condenser pumps noncondensing, thereby increasing the quantity of this vapor fuel above that when operating these pumps condensing. In short, always provide a sufficient exhaust steam for preheating the boiler feed water, which is economy beyond any dispute.

Having stated the facts, we will now proceed to prove them. The advantages to be derived from an exhaust steam feed water heater and purifier may be divided in three general classes, to-wit:

1. Economy. Saving of fuel.
2. Purification. Precipitation of some of the scale forming matter both in suspension and in solution in the heater and before being fed to the boiler.
3. Protection to boilers. Water being fed to boilers at high temperatures causes less change in temperature in boiler shell and tubes, thereby reducing the range of fluctuation in pressure and thus less breathing action in the boiler shell and joints, and to a certain extent acts as a guard to keep oil from entering into the boiler by way of the feed water.

In plants operating without the use of a feed water heater, the highest ordinary temperature at which water will be delivered to boilers is that of

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

the hot well; usually about 100 degrees Fahrenheit. This is far from the temperature to which water must be raised before the point of evaporation is reached, necessitating the employing of positive heat.

The product of the number of pounds of water required and the difference in temperature between the raw water and the water at 210 degrees, which is about as high as can be obtained in a heater of the ordinary type, gives approximately the number of British thermal units of heat necessary to perform this task. From the table of properties of saturated steam may be found the heat value of one pound of exhaust steam in British thermal units, and, dividing the number of British thermal units required, as determined above by the tabular value per pound, the number of pounds of steam necessary to heat the feed water is given.

Thus, if feed water supplied by means of a heater and at 210 degrees Fahrenheit, were previously supplied from the mains, at 60 degrees Fahrenheit, the relative cost of making steam will be at, say, 100 pounds gage pressure.

100 (177.99 — 28.08)

1188.77 — 28.08

=12.91% saving.

Even when the exhaust is used in connection with a heating system, a heater may be inserted in the line under the same back pressure as is on the system, for the small amount of steam required to heat the feed water and the economy thus derived will more than compensate for the loss of the steam from the system.

Everyone realizes the importance and, in fact, the necessity of removing scale forming materials from the feed water before it enters the boilers. It is much better to catch these impurities upon the outside than to allow them to enter, and by their damaging presence decrease the steam generating power of

the boilers. There is to be found more or less foreign matter, either in suspension or solution, in most waters, and methods should be used to remove these as completely as possible before the water will be fit to be used as boiler feed water.

It is a well known fact that the effect of cold water entering a boiler in operation is to set up strains and stresses which may cause leaks or fractures. By this preheating of the feed water to almost the point at which evaporation begins, there is a very little danger of such trouble from that source.

Knowing the ratio of evaporation to coal or oil consumed, and the calorific value of them, the saving thus effected will become apparent.

Without going into further detail, it may be quoted from authorities that the relative cost of using feed water at any one temperature, as compared with the use of water at any other temperature, is the reciprocal of their factors of evaporation.

F. A. PAGE,
Boiler Inspector.
California Industrial Accident Commission.

Self Cooled Transformers Can Be Operated Under Emergencies

On account of self cooled transformers being designed on an ambient temperature of 40 deg. C., advantage of the full rating of the transformer may not be obtained where temperatures are above this point. Such a case happened in a substation of the Southern California Edison Company, so that artificial cooling was necessary. To meet the conditions, air ducts were installed around the base of the 5000-kva., single phase maximum rated, self cooled radiator type transformer, so arranged with openings placed between the radiators to direct the flow of air supplied by a motor driven blower.

With this method of artificial cooling, these maximum rated transformers will carry 25 per cent overload continuously with the same winding temperatures as at full load without artificial circulation of air.

The transformer is provided with a hot spot temperature indicator, an oil expansion tank and a high voltage tap changer, the latter operated by a hand wheel in a convenient position above the transformer cover.

The procedure proved to be inexpensive inasmuch as new transformers capable of handling this overload would have had to be installed in place of those of a lower rating. The cost of operating the blowers is nominal as only small motors are used.

Welding Saves Traction Company Time and Money

Synchronous Motors in San Francisco Substation Repaired During Off-peak Hours With No Interruption to Power Supply

Replacement or repair of electric railway substation equipment when auxiliary apparatus is not available to replace the unit which is placed out of commission during the period necessary for the repairs to be completed, was recently solved at the Bryant Street Substation of the Market Street Railways of San Francisco.

The major equipment consists of six 2150-hp. synchronous motors operating at 11,000 volts direct connected to 1500-kw. direct current generators. The motors are started from a compensator. The squirrel cage windings are under a very severe strain at starting due to heavy short circuits and vibration. This strain caused a loosening of the bars on

asbestos to insulate the coils from the heating, at the same time arranging a blower to supply a blast of cold air through the coils while the work was in progress. The work was performed by R. J. Strecker of the Peerless Welding Company.

The actual welding was done during off-peak hours. The stator was moved forward by jacking, allowing the squirrel cage winding to project two inches. Four to six coils were welded an hour, each coil having four bars. The stator frame was moved in both directions to allow welding the bars at both ends.

Each of the five motors on which the work was done in this fashion was out of operation but four hours, two hours



Welding the bars on the squirrel cage winding of one of a battery of synchronous motors in the Bryant Street Substation of the Market Street Railway in San Francisco during off-peak hours saved the traction company \$900 as well as avoided an interruption of service.

the short circuit ring, causing them to burn off. There was danger at any moment of any one or all of the motors failing unless steps were taken to repair or replace them.

Company engineers at first recommended that the rings be replaced but when it was taken into consideration that the machine on which the replacement was to be made would be out of commission four or five days, it was found that this was impractical. Load conditions are such that the entire battery of six generators are needed to supply current to the lines during the peak hours, that is from seven to nine o'clock in the morning, from eleven-thirty to one-thirty, and again from four-thirty until six-thirty in the evening.

It was decided to remove the field spools from one motor at a time, sending them to an outside shop to be welded. This also proved impractical as but three spools could be removed at a time.

The work was finally performed by constructing plates of sheet iron and

in the morning between load periods and two hours in the afternoon. Approximately twenty hours was required to complete the work on the five motors.

The cost to the company for the entire job of welding on the five motors was \$100, or \$20 per motor. Engineers estimated that the replacement cost of the worn parts would have been \$200 per motor, or \$1000. This money saving does not take into consideration the fact that the company's street car service would have been considerably impaired had any one of the units been forced out of operation while the replacement was being made.

According to J. E. Beckman, chief operator for the traction company, welding of the worn parts has improved the operation of the motors more than replacement would have done. Contact is better as a result of the weld than if new parts had been installed and riveted. The motors also start more quickly and with less danger of short circuiting. Engineers of the traction company are highly pleased with the results of the job.

Use of Timber Preservative in Mines Is Economical

Throughout nearly all the metal mining districts of the West, the consumption and cost of mine timber has materially increased in the past decade. Likewise the more durable varieties of timber are becoming scarcer and the source more remote from points of consumption, consequently in many localities the less durable varieties must now be used.

In proximity to the important mining centers of Butte, Montana, and of Coeur d'Alene, Idaho, the accessible supply of red fir is largely exhausted. As a result the more plentiful but less durable varieties—yellow and lodge pole pine, tamarack, with a subordinate amount of spruce and white fir (balsam)—are being extensively used. The timber cost in two of the leading mining districts in Montana and Idaho has more than doubled in the past 15 years.

It is obvious that one of the rapidly increasing items of expense in mining operations is the cost of timber, to say nothing of the labor cost of installation. Therefore, any practical means that may be employed to prolong the life of mine timber will greatly reduce mining costs, and effect important economies in operation.

Mine timbers are destroyed by four principal agents—decay, insects, fire, and mechanical abrasion. In general, more than 50 per cent of the timber used in the mines is destroyed by decay and insect attack, but perhaps not to exceed 15 per cent of the total is subject to replacement, that is, where the working place will be kept open longer than the natural life of the timber.

Timber conservation may be accomplished in part by the better selection, preparation and storage of timber intended for mine consumption, but the most effective means is by treating the timber, to prevent decay, with some standard preservative before it is placed in the mine.

It is believed that the artificial preservation of mine timber offers an attractive field in which important economies may be realized, and that the time is opportune for promoting timber preservation in the mining industry.

The explanation of this is that mining timber in most localities, until the last few years, has been plentiful and comparatively cheap. As a result no inducement was offered to practice economy in its use, furthermore, mine operators in general have not been well informed concerning preservatives, treatment methods and costs, and the benefits to be derived from the use of treated timber.

The Bureau of Mines, in cooperation with the United States Forest Service, has only recently undertaken a systematic investigation of the decay of mine timbers, and its causes and prevention. The bureau's observations to date have led to the conclusion that not only important savings in the cost of operation may be realized by the use of treated timber, but also that the prevention of mine timber decay will remove one of the principal sources of heat and vitiation of mine air, which in turn has an important bearing on the problem of mine ventilation.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Sale Lake Electragist Improves Store With Decoration

The Model Electric Company's store at Salt Lake City is an example of the progressive type of establishment which is so rapidly replacing the one room in which the electragist formerly attempted to function. Fred C. Wolters, the manager, made an extensive trip through California last summer, spending considerable time in San Francisco, for the purpose of gathering suggestions and ideas concerning electrical store arrangements. He has put many of these ideas into practice, with the result that he has a store with an individuality that is most pleasing.

The backs of the show windows are paneled with 6 x 6 inch glass panels, which keep out the dust, coal smoke, etc., and also allow plenty of daylight to enter the front of the store, and also permit the passerby to view the entire store from the sidewalk. Each window is newly decorated at least once a week.

The store has four departments: the main showroom and salesroom, a fixture room for the better class of fixtures, the office (a separate room), and the basement, where fixtures are manufactured and repair work done.

One of the features of the interior plan of the store is the color scheme, which Mr. Wolters says is largely responsible for the steadily increasing sales. The walls have a dainty blue tint, while the ceiling is a light cream. All the woodwork is enameled white, with baby-blue trimmings.

The floor is hardwood, with inlaid diamond panels.

It will be noted that the showcases are not crowded with appliances, but individual effects are applied wherever possible.

A Set of Primary Rules for Good Window Displays

A Primer for the Electrical Contractor-Dealer to Be Remembered When Decorating the Windows of His Establishment

A good window display is half a merchant's stock in trade. It is your window that attracts the casual purchaser and brings him to your store. There are rules and rules for window displays. The following primer can be memorized by the contractor-dealer and the electric appliance dealer with the knowledge that it contains all of the elements. The remainder rests with his ingenuity and originality.

1. Keep your windows clean. Have them washed frequently. If your own employes haven't time, get outside help. It will pay.

2. Don't crowd your window.

3. Avoid the other extreme. Too little in a big window will cause the merchandise to be "lost."

4. Card holders are useful. They'll keep price cards from falling over on their faces.

5. Make your display attractive to the eye—and the purse—but don't make it so "pretty" the merchandise is forgotten in admiration of the "trimmings."

6. Make your store front reflect you. It is the exterior which most people see. Impressions are made by exteriors.

7. Put the emphasis on the goods, not on the decorations.

8. Use art only to create a desire to buy the goods displayed.

9. Be sure your window lighting is the best obtainable.

10. Have the backing of your window high enough to shut off the view of the store interior.

11. Use a dark color in the background when displaying light colored goods, and vice versa. Get contrast.

12. To express coolness in a window use gray, light green or light blue for the color scheme.

13. To show warmth use reds, yellows, oranges—warm colors.

14. Dust out the window space frequently.

15. Never allow soiled or flyspecked cards or merchandise to remain on display.

16. To help the eye to travel quickly from a card to the object displayed, connect the two with white tape or ribbon. An arrow will have the same effect.

17. Invest a little money in stands on which to better display your merchandise. It will pay.

18. Empty cigar boxes make good "building blocks" to erect most any size or shape foundation for a display.

19. Crepe paper, bunting and cheese cloth are inexpensive coverings and draperies.

20. Make your display fit the season.

21. Get ideas from merchants in other lines of business.

22. Plan your displays ahead—days and even weeks ahead.

23. Get all material ready for the new arrangement before the old display is taken out.

24. Keep a "window note book." Jot down in it ideas you see which you may use later.



The store of the Model Electric Company in Salt Lake City had a fine location, good windows and everything in its favor. Fred Wolters, the manager, recently made a visit to the principal cities of the Pacific Coast to get ideas to improve it.



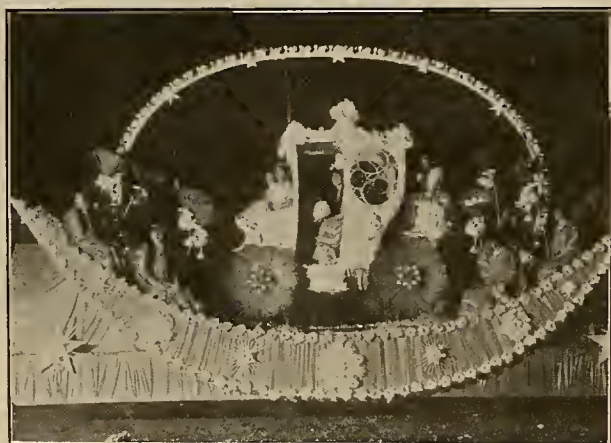
The interior of the store is both pleasing and imposing since the ideas were carried out. Effective coloring and decorations, careful layout of departments and the most effective manner of displaying his wares, have won the store more trade.

The Electrical Industry and Parades and Festivals

A Pictorial Representation of How the Men in the Electrical Industry in the West Have Utilized Electricity in Adding to the Beauty of Colorful Parades



During a recent annual convention in Los Angeles electricity played a prominent part in one of the big street parades. Long lines of delegates carried two-colored parasols, inside which was a cluster of small Mazda lamps. Current was supplied from cables carried in the hand connected in turn with motor generator sets carried on motor trucks at intervals in the parade.



One of the colorful floats in a recent night parade during an annual carnival in Southern California. Thousands of electric lights were used. The float was carried on a street car truck.



Any man in the electrical industry would be pleased to have this float represent his company. Two tons of roses were used in its preparation. A Portland company used it recently.



This enterprising Portland contractor-dealer advertised his wares to good advantage with this float in a recent parade in conjunction with a manufacturer's show and exposition.



This is an example of how the electragist can aid the community in successfully carrying out the decoration scheme for a carnival. One designed this well lighted triumphal arch.

The Sales Letter as a Business Getting Medium

The Results Secured by the Denver Gas and Electric Light Co. Illustrate What the Electragist Can Do

By JOHN T. BARTLETT
Boulder, Colo.

Is it harder to get business in 1922 than in previous years? Doubtless so, for competition is keener. Can it be secured in the case of such commodities as electrical fixtures, appliances and service? It surely can—if the ground is carefully studied and the sales plan cleverly carried out.

"If all people are interested in curtailing expenditures," some one asks, "how can one expect to sell them wiring which they previously have gone without?" The explanation of the fact that people actually can be sold is, partly, that there are many possible customers to sell on whom no serious effort has ever been made. It is partly also that there are many householders whose incomes have not been seriously decreased. And finally, capitalizing the prevailing thrifty mood of the public, there are such particular classes as the one reached by this successful sales letter, used by the Denver Gas and Electric Light Company. The letter follows:

"A government report calls our attention to an unnoticed waste in the following statement:

"WASTING LIGHT

"A lighting expert says that about \$200,000,000 worth of light is wasted every year in this country through failure to keep windows, globes, reflectors and other light sources free from dust and dirt.

"The lighting bill for the nation is about \$500,000,000 and if this expert is right, we are wasting two-fifths of this."

"We have in stock ready for demonstration and installation a 100% lighting fixture and an equally efficient window lighting unit that will eliminate every wasting cause mentioned above.

"STOP AND THINK

"It is our intention to call on you in the near future. Won't you please designate a convenient time on the enclosed card?"

"Sincerely yours,

"W. E. McCOURT,
"Representative."

This letter was produced in two colors. The "Wasting Light" quotation and "Stop and Think" were printed in red. The balance of the letter was in blue in harmony with the letterhead.

This letter, together with the other three which were recently described on these pages were on the letterhead of the Denver Gas and Electric Light Company. They were all personally signed, however, in each case by the sales representative into whose territory they went. The personal note was emphasized by using the intimate, "Dear Mrs. —" instead of the common "Dear Madam." While this question is open to argument, the psychological effect of the greeting argues in favor of the warmer salutation.

Making this personal argument stronger still, the company in a recent sales letter did not use letterhead paper, but a simple sheet and simple envelope. The color was cream; the size of the envelope was one which is commonly used for social correspondence. This letter, which drew well, was addressed in handwriting, and its whole conception was such that the prospect receiving it in her mail had none of those unfavorable reactions to "advertising matter" often immediately aroused.

Whatever the electrical man sets out to sell by letter, he should take pains that the list he uses, to the extent practical is a list of known prospects. In selling wiring, for instance, it certainly is more simple to circularize only those homes which do not have it. In selling fixtures to present light users, an old district naturally contains a far greater proportion of live prospects than a new district. More actual sales are often secured with a small but choice list, than with a bulky list to which no thought has been given.

In its letter the Denver Gas and Electric Light Company did not attempt to completely sell. The purpose of the letters is to carry the recipient along to the point where he will ask for a sales representative to call. In other words, only a part of the burden falls on the letter. It remains for the salesman to get the actual order.

The Electrician's Share in the Labor Cost of a Home

The Division of Building and Housing of the Bureau of Standards has recently completed a table showing the relation the amount paid to each labor group bears to the total cost in the construction of a six-room house. The averages were constructed from reports gathered in a survey covering a large number of houses in all parts of the country. The results are rather startling, especially from the point of view of the contractor-dealer.

In the table which follows, the percentages are based on the labor cost alone:

Trade	Frame House	Brick House
Carpenters	49.6	32.2
Bricklayers	6.2	21.5
Hod carriers	2.2	6.7
Plasterers	7.9	3.8
Plumbers	3.7	7.6
Electricians	2.6	2.5
Painters	10.0	6.3
Common laborers	6.3	9.9
All others	6.5	4.5
Total,	100.0	100.0

It will be noted that the amount which falls to the electrician is, with the exception of the hod carrier, the smallest outlay for labor in the construction of a home. Moreover it will remain to be the smallest item until every member of the electrical industry adds his voice to the cry of "More electricity in the home." The amount which the electrician receives cannot be increased until more wiring goes into the home. This will not come about until the public demands it. There is much educational work to be done before this happy millenium arrives.



EFFECTIVE WINDOWS

The Schwartz Electric Company of San Francisco puts into practice all of the rules governing effective window displays, as the above reproduction shows. The one vacuum cleaner is displayed to greater advantage than if the window is cluttered up with four or five.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

New Mining Company in Utah

Seven Million Dollar Company Organized to Take Over Existing Interests

The formation and financing of one of the largest mining organizations in the state of Utah has just been completed. The new organization is the Park City Mining and Smelting Company, organized under the laws of Colorado, with an authorized capital of \$7,500,000, divided into 1,500,000 shares of \$5 each.

The corporate powers of the company include mining, milling and ore dressing, smelting and the construction and operation of power plants and transportation lines.

The officers of the company are: G. W. Lambourne, president, treasurer and managing director; Moylan C. Fox, vice-president; Oscar N. Friendly, manager; George S. Krueger, superintendent of mines; D. C. Murphy, secretary; W. A. Dunn, assistant secretary.

The directors are: Otto Luedeking of Cincinnati; Harry M. Stonemetz of Boston; Adolph G. E. Hanke of New York; D. N. Friendly of Park City; Moylan C. Fox, William M. Bradley and G. W. Lambourne of Salt Lake City.

Stock of the new company is in its treasury and will be issued as necessary, to acquire and develop mining properties for the corporation. The Daly-West Mining Company, of Park City, will be taken over by the Park City Mining and Smelting Company as soon as the details can be arranged. Stockholders of the Judge Mining and Smelting Company of Park City will, in the near future, be invited to transfer the property of that company to the new company upon an equitable basis. Other properties may be acquired subsequently under the corporate powers of the new company.

It is expected that the new company will be an important factor in the further development of the mining industry of the state of Utah.

Seattle Will Call For Bids For \$2,000,000 Pipe Line

The Seattle Board of Public Works has approved plans and specifications for Cedar River pipe line No. 3, to be built from Swan Lake to the Volunteer Park Reservoir. Bids for this improvement, which is estimated to cost \$2,000,000, will be called for this month. The line will be approximately 17 miles long, and will be 64 inches in diameter throughout most of the length. Specifications call for steel riveted, lock bar, forged weld and electric welded steel pipe, and also for creosoted wood stave pipe. The Swan Lake water supply sys-

tem when completed will cost \$6,000,000, and will provide for a second reservoir on Capitol Hill. When pipe line No. 3 is constructed lines Nos. 1 and 2, now leading from the Cedar River watershed will be diverted into the lake, and a tunnel will be built from the lower end of the lake to the point where No. 3 line begins.

Portland Seeks Money to Improve Columbia River Channel

Appropriations to the extent of \$1,750,000 are being sought by the city of Portland from the Rivers and Harbors Committee of the House of Representatives for permanent improvements to the channel of the Columbia River. W. D. B. Dodson, general manager of the Portland Chamber of Commerce, and Colonel George H. Kelly of the Port of Portland Commission, recently appeared before the committee in Washington in behalf of the appropriation.

The United States Army Engineers have recommended a channel 500 feet wide and 30 feet deep at all stages of the river. The money will be used for the purpose of purchasing a new dredge and for building wing dams to prevent shoaling at various points in the river.

Large Utah Mine Replaces Steam With Electrical Equipment

The Grand Central mine at Mammoth, Utah, is installing equipment for the electrical operation of its property, on an extensive scale. The power line from the Chief Consolidated mine at Eureka has been extended to the Grand Central, and transformers and other equipment are being placed in position.

The machinery, now being driven by steam, will be operated entirely by electricity. The Chief Consolidated Mining Company, which now controls this property, has equipped all of its properties with electrical machinery. The company is convinced that electricity is the most reliable and economical power that can be used at a mine, and that changing from steam to electricity, even though a relatively good steam plant is being replaced and the cost of replacement is high, is in the line of permanent improvement.

Under the terms of a new ordinance recently brought before the city council of Yakima, Wash., and which is being held over for final passage, electrical contractors of that city will be required to pay a \$200 annual license fee. The former fee was \$25. Besides the annual fee, inspection fees will be paid to the electrical inspector.

Midway Plant to be Enlarged

San Joaquin Light and Power Corporation to Install New Steam Plant Unit

Within less than a year after the completion of a 17,000-horsepower unit in the Midway steam plant at Buttonwillow in Kern county, the San Joaquin Light and Power Corporation has announced that work will be started immediately on a second 20,000-horsepower unit to be completed by August 1st. The unit is necessary to take care of the peak load during the irrigation period.

The new unit will consist of a 20,000-horsepower Allis-Chalmers turbo-generator and will cost \$1,750,000. The fuel to be used will be natural gas piped from the Elk Hills oil fields nine miles away. The gas will be carried in an 8-in. welded pipe under a pressure of 450 pounds per square inch.

The additional steam capacity required to drive the new machine will be generated by six 825-horsepower Connelly tubular boilers, making a total of fourteen high pressure boilers available for the two turbines. Water for these boilers and for the condensers is pumped from a battery of six wells, having a total capacity of 4,000 gallons per minute.

The power generated in this plant is available for use in the oil fields, where electricity for drilling and pumping is rapidly taking the place of gas and oil engines, and for the increasing agricultural load in Kern county, where 35,700 acres of rich farming land was brought under electric pump irrigation during the last two years.

The San Joaquin Company and the Southern California Edison Company recently requested the State Railroad Commission to approve a contract whereby the former agrees to furnish the Edison company 80,000,000 kilowatt-hours of electric energy between August 1, 1922 and June 1, 1923. The San Joaquin Light and Power Corporation will reserve the 12,500-kw. unit in the Midway steam plant for the exclusive use of fulfilling the contract. In the request the companies point out that power can be generated more cheaply at the Midway steam plant through the utilization of natural gas for fuel than it can in the steam plants of the Southern California Edison Company where fuel oil is used.

In commemoration of its twenty-fifth anniversary, the Tokyo Electric Light Company donated to the city of Tokyo \$500,000 for the construction of an electrical research laboratory and its maintenance.

Federated Engineering Societies Study Reforestation

Indications that the Federated American Engineering Societies will take an active part in a campaign for the reforestation of partially devastated areas developed at a recent meeting of the executive committee of the organization when a motion was adopted appointing a committee to consider this matter.

Speaking of the general subject of reforestation, which is of vital interest to the West in that the major portion of the nation's timber supply is located west of the Rocky Mountains, Mortimer Cooley, president of the federation, said:

"You will realize at once where lumber is necessary in engineering operations, there is even a more important consideration. You only have to look at China and some other countries to see what has been the effect of the destruction of the forests to those countries. Not only has a large amount of water power been wasted, which could have been utilized in developing the prosperity of the countries, but because the lumber has been removed from the hills and mountains, floods have followed and as a consequence, the lands have been ruined.

"We should bring to the attention of the people of the country an appreciation of what the preservation of these forests would do for the country at large. I cannot think of anything more vital to the interest of the country."

He further stated that the best authorities gave it as their estimate that at the rate that lumber is being consumed, not at an increased rate, that the lumber resources of this country will last only 60 years and that there is no uniform effort being made throughout the country towards preserving the forests or towards restoring them.

Funds Raised for First Street Railway Payment in Seattle

The city of Seattle has succeeded in raising the \$1,245,000 necessary to meet various items of bonded indebtedness which fell due on March 1 in connection with the purchase of the street railway system. Operation of the railway was such that during the latter part of 1921 there were insufficient funds on hand after the payment of operating expenses to raise the money necessary to pay the first installment of \$333,000 on the \$15,000,000 purchase price with \$375,000 interest which fell due at the same time. In consequence the entire street railway department was placed on a warrant basis, with warrants bearing six per cent interest. Since December 24, when this system went into effect, there were issued \$600,000 in warrants, which are now being redeemed.

The division of water rights of the California State Department of Public Works has announced that after March 1 its offices will be located at 912 Eighth Street, Sacramento. The offices were formerly located at 632 New Call Building, San Francisco.

Owing to the unprecedented demand for copies of the February first annual issue of the Journal of Electricity and Western Industry the supply is exhausted. The circulation department will pay subscribers twenty-five cents for each copy sent to 531 Rialto Building, San Francisco. Copies must be in first-class condition.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

While Muscle Shoals is a southeastern water power and the South will receive more of the direct benefits from its development than will any other section, yet the project has great national significance. In the first place its control is a national matter. The project can be leased or disposed of only as the Congress of the United States shall see fit. That is the principal reason why the consideration of its disposal, which is in progress before the Military Affairs Committee at the House of Representatives, is focusing more attention than the consideration of the treaties on the other side of the Capitol.

One of the points of greatest interest to the water-power industry was brought out by Major General Lansing H. Beach, the Chief of Engineers, when he declared there should be exceptions from the fifty-year limit on water power leases as laid down in the Water Power Act. Not only should powers of exceptional size receive special consideration, but in the case of many water powers, Gen. Beach believes more than fifty years is required to develop a market for enough of the power to make the project a paying one. The territory tributary to Muscle Shoals, Gen. Beach pointed out, is not thickly settled. Manufacturing is not highly developed and the length of time that would be required to develop a market for the power must receive careful consideration. He said it took twenty years to utilize all of the power that was made available at Niagara Falls, in spite of the fact that it is located in the heart of a great industrial section.

Interest in the whole matter has been heightened materially by the introduction of a bid by the Alabama Power Company. This practically assures the completion of the project. It is believed that Congress will be forced to accept either that offer, that of Henry Ford, or complete the dam and lease the finished project. It is very evident from sentiment within the committee that Mr. Ford's offer will have to be modified in some particulars before it will recommend further consideration on the part of Congress. While Congress will not be called upon for large initial appropriations in the case of the Alabama Power Company offer, it does not have the numerical support among the people as does the Ford offer, which not only holds out a promise of cheap fertilizer, but also of cheaper automobiles, tractors, and possibly cheaper aluminum.

As a result of the controversy over Muscle Shoals, the development of water power is receiving wide publicity and is having the effect of educating the public to its potential advantages.

Dye Probe Begins

Under the guidance of Senator Shortridge, of California, the investigation of the dye situation was begun by the Senate Committee on February 20th. Other members of the committee con-

ducting the investigation are Senator Ashurst, of Arizona, and Senator Sterling, of South Dakota. Senator King, of Utah, is leading the attack on the American dye interests which he claims constitute a monopoly which they seek to maintain by special legislation. Senator Frelinghuysen, of New Jersey, is taking a leading role in the defense of the domestic dye industry and in endeavoring to establish irregularities in the practices of American importers and the German dye interests. A long and detailed investigation, certain to be characterized by sensational charges and counter-charges, is in prospect.

The Federal Power Commission

The matter of the depreciation regulation recently promulgated by the Federal Power Commission was the subject of discussion at an executive session of the Commission on February 20. Two months ago representatives of the electrical industry appeared before the Commission urging a liberalization of the depreciation requirements of the regulation. It is understood that the Commission itself is divided on this question. Secretary Fall, of the Interior Department, is said to feel that the regulation is so strict as to discourage the investment of money in water power. Secretary Wallace is said to be of the opinion that depreciation accounting by the Federal Power Commission must follow the system set up by the Interstate Commerce Commission, the Bureau of Internal Revenue, and other government departments. The decision is said to rest in the hands of Secretary Weeks who promises an early decision of the matter.

Southern Sierras Company Uses Film to Spread Information

At the seventh annual convention of the officers and employees of the Southern Sierras Power Company and associated companies recently held at Riverside, California, a pre-eminent feature of the program was the showing of the motion picture, "Kilowatt the Conqueror," filmed by the power company for the purpose of showing in a comprehensive manner the essential properties which make up its system. These properties extend from Rush Creek in Mono county in the high Sierra, to Yuma, Arizona, a distance of some 539 miles, spanned by what is claimed to be the longest transmission line in the world. In conjunction with the pictures of each plant, views are flashed on the screen of the various industries in that vicinity which are supplied with power.

The film has been shown both in New York City and in Denver before bonding concerns. Several other western public utility organizations are using this method in presenting their cases before financial bodies. The Southern Sierras Power Company's film has been highly commended by publicity officials of the National Electric Light Association, who have stated that it is the best of its kind yet made.

West Exceeds Nation in Water Power Resources

U. S. Geological Survey Figures Show Western States Have Most Developed and Undeveloped Water Power

The West possesses seventy-two per cent of the potential water power of the United States, according to a survey recently completed by the U. S. Geological Survey. Based on the minimum amount of potential water power in this country, estimated from stream flow figures which do not take into consideration water storage, there is available in the eleven states west of the Rocky Mountains slightly more than 20,000,000 horsepower in undeveloped hydroelectric resources, the survey shows.

The survey also includes a survey of all water power plants of 100 horsepower and over in the country. There were in 1921 a total of 3116 such plants with an installed capacity of 7,852,948 horsepower. Of this total 79 per cent are public utility plants and the remainder manufacturing plants. New York still maintains its lead in the amount of developed water power with 1,291,857 horsepower. California is a close second with 1,149,099 horsepower while Washington is third with 454,356 horsepower and Montana fifth with 344,420 horsepower.

The number of plants, both public utility and manufacturing, and the installed capacities for the eleven states comprising the Western Empire follow:

	No.	Capacity
Montana	28	344,420
Idaho	45	224,368
Wyoming	9	7,560
Colorado	57	91,648
New Mexico	3	799
Arizona	8	38,760
Utah	64	106,096
Nevada	9	13,450
Washington	69	454,356
Oregon	74	185,215
California	134	1,149,099
Total, 500		2,615,771

The total shows that the West, with less than one-sixth of the water power plants of the nation, develops approximately one-third of the total power.

The following table, which shows the potential water power in each of the

states, as well as the percentage of the total undeveloped water power of the nation, namely 27,943,000 horsepower, it is interesting to note that the state of Washington possesses the greatest power resources of any state in the Union. The table follows:

	Horsepower	Per Cent
Montana	2,749,000	9.84
Idaho	2,362,000	8.45
Wyoming	773,000	2.76
Colorado	842,000	3.01
New Mexico	160,000	.57
Arizona	893,000	3.20
Utah	743,000	2.66
Nevada	172,000	.62
Washington	4,932,000	17.65
Oregon	3,148,000	11.27
California	3,424,000	12.25
Total, 20,198,000		72.28

The figures in the above table are for absolute minimum. In general practice water power plants are installed which utilize the stream flow far in excess of this minimum.

Coal Production in Washington Drops 36 Per Cent in 1921

According to figures issued from the office of State Mine Inspector at Olympia, coal produced in the state of Washington in 1921 amounted to 2,422,106 tons, having a value at the mine of \$10,260,805. The coal output for 1921 was 1,334,775 tons below that of 1920, when the total for the year was 3,756,881 tons, the decrease being nearly 36 per cent. This decrease was due almost entirely to the closing down of 90 per cent of the mines in the state on March 15, re-opening the latter part of August, on account of the wage controversy between the miners and operators.

The average number of employees in the coal mining industry in the state for 1921 was 4,575, these employees working an average of 157 days each.

Kittitas county had the largest number of mine employees, with a total of 1,934, while King county's total was 1,360.

Utah Commission Has Control of Municipal Utilities

The attorney general of Utah has advised the city attorney of Logan, Utah, in response to a query as to the public utilities commission's jurisdiction over municipally-owned electric plants, that a municipal corporation operating its own electric plant is a public utility subject to the jurisdiction of the state commission.

The city attorney's letter referred to the constitutional provision enabling cities to incur indebtedness for the purpose of constructing such plants, to which the attorney general replied:

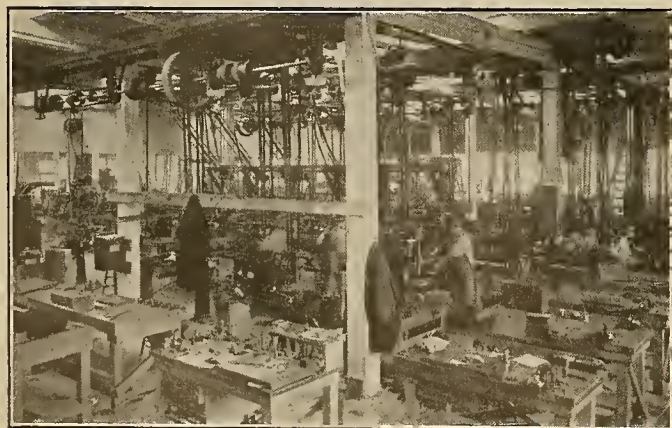
"Your observation that bondholders might object to the regulation of such utilities by the commission because it interferes with the city's control of such utilities, does not appeal to us. We do not see why bondholders should be concerned as to who regulates the rate charged for light or power furnished for the reason that it is not with the profits that the bonds are paid, but with taxes levied by such municipality for the very purpose of paying the interest as it accrues and the bonds themselves when they become due."

City officials of Logan recently met with the public utilities commission of Utah in regard to some of the problems which are confronting them in the operation of the municipal electric light plant at Logan. The municipal plant has depreciated to a considerable extent, and it has become necessary to provide some means of rehabilitating same.

The question of increased rates was discussed, together with other matters in connection with the operation of the plant. The matter has not come before the commission for final hearing, and therefore no definite action was taken.

The city officials are considering the question of installing meters.

The Union Pacific Railroad will spend \$100,000 for the improvement of its yards and facilities in Denver, according to a statement made by Carl R. Gray, president of the system, during a recent visit to the Intermountain city. The money will be largely spent for increased trackage. President Gray discounted any statements that reduced freight rates in line with the agitation which has been going on in the Intermountain district will be forthcoming owing to high fuel and labor costs.



SEATTLE COMPANY COMPLETES NEW FACTORY

The Kilbourne and Clark Manufacturing Company, pioneer western manufacturers of radio equipment, recently sold its Seattle factory to the Westinghouse Electric and Manufacturing Company. Since that time the company has completed the above factory building in the city's industrial district. The building houses the commercial and engineering staffs, and the raw material, stock, machine shop, electrical winding, electroplating,

assembly and tool departments as well as the engineering laboratory. The company's activities now cover commercial and popular radio equipment, electrical specialties, small transformers and motor generator sets. The company has several contracts for the manufacture of radio equipment for the Army and Navy departments. The view of the interior shows the arrangement of the machinery.

Los Angeles Railway Investigates Trackless Trolley Cars

An extensive investigation to establish the relative merits of the trackless trolley and the storage battery bus for some contemplated extensions of the Los Angeles railway system, is being conducted by Phil Harris, chief engineer of the company. According to the statement of George H. Kuhrt, general manager, the adoption of one or the other form of transportation for the Griffith Park extension and the contemplated Western Avenue service, is dependent upon some favorable action of the state commission in connection with the present pending application for a small increase in fares in the Los Angeles service.

The property owners and the Western Avenue Business Men's Association are said to be very anxious for these extensions of railway service from Third to Fifty-fourth streets on Western Avenue, as this section has undergone a remarkable growth in the last two years and must have some form of adequate transportation.

There has been some talk of organizing a gasoline bus system, among the interested real estate and business men, patterned after the Fifth Avenue, New York, buses. A vehicle for demonstration purposes has been making trial runs in the last few days.

Idaho Power Company to Rebuild Large Boise Substation

In order to obtain increased efficiency in and centralization of power furnished by the Idaho Power Company to local consumers in Boise, a consolidation is being made of the substation facilities of the company in Boise at one plant instead of at the two stations now in use. The Seventeenth Street station is the one which will be used, and this is being remodeled and considerable equipment is being installed. The work will cost in the neighborhood of \$55,000. It is expected by the latter part of spring or early summer that this station will be taking care of the complete service of the company in Boise. The completion of the work at the Seventeenth Street plant will mean the closing of the station located at Fourteenth and Grove streets as far as substation use is concerned, and that building will be used for storage and warehouse purposes.

Measure Proposed to Sell Power to Municipalities

Surplus power developed by federal irrigation projects would be sold to municipalities and private interests under the terms of a bill which has been introduced into the House by Representative Carl Hayden of Arizona. The measure proposes an amendment to the Reclamation Act whereby power developed in conjunction with irrigation projects would be leased for periods not to exceed ten years by the Secretary of the Interior. Preference in the leasing and selling of power would be given to municipalities. Exception is made to the ten-year period in the cases of some of the larger projects in Texas, New Mexico and Arizona where power would be sold for fifty-year periods provided approval is given by the various water users' associations.

Stockton Company Announces Vast Hydro Project

Western States Gas and Electric Company to Develop 100,000 Hp. on American River Near Placerville, California

A license for the development of a four-stage hydroelectric project on the South Fork of the American River near Placerville, California, has been granted by the Federal Power Commission to the El Dorado Power Company, a subsidiary of the Western States Gas and Electric Company of Stockton. The completed project will develop 100,000 horsepower and will cost approximately \$100,000,000.

Plans for financing the company have already been undertaken. The Western States Gas and Electric Company has applied to the California State Railroad Commission for permission to issue \$5,000,000 in 6 per cent bonds which will mature in twenty-five years.

The first step in the development calls for the erection of a power plant above Placerville in which there will be two 10,000-kilowatt hydroelectric units. The plant will later be brought up to its full capacity of 80,000 kw.

The project as proposed utilizes an existing canal, 25 miles in length, known as the El Dorado Ditch, which will divert water from American River, a short distance below its confluence with Silver Fork. The canal will be enlarged from a capacity of 40 cubic feet per second to 350 cubic feet per second. From the canal the water will be conducted through a 3-mile conduit to the penstocks which supply the turbines to be located in a power house on the American River about one mile below the mouth of Silver Creek. The turbines will operate under a head of 1,900 feet. The company plans to provide for an ultimate installation of 100,000 horsepower to be developed in four stages.

The project includes six storage reservoirs on the headwaters of American River, with an ultimate capacity of 90,000 acre-feet. Three of the reservoirs, to the capacity already constructed, are included in the license for Project No. 78, which was recently issued to the Western States Gas and Electric Co. The El Dorado Power Co. will acquire all water and property rights involved in these reservoirs, and it is intended to amend the present license later to include them.

The public hearings on this project brought out data showing that the greatest economic use for irrigation purposes alone demanded that as much as possible of the water on the upper American River be used for power. By generating electric energy in the mountains and transmitting it to the highly productive agricultural area in the vicinity of Stockton, about 3 acres per horsepower can be irrigated by electric pumping. If the water necessary to produce the electric energy were to be diverted to irrigation uses in the upper American drainage, the equivalent usefulness of the water would be 1 acre per horsepower. Furthermore, but little of the water diverted to irrigation use on the upper American River drainage could again be productively used, whereas the same water, if used to generate electricity, can be used again for the same purpose at a plant lower down on the stream.

According to Samuel Kahn, general manager of the company, the work which will be undertaken this spring and which will be completed by January 1, 1924, includes the following:

1—Construction of new power house in canyon of South Fork of American River, above Placerville and near Camino. Two units, each developing 10,000 kilowatts or a total of more than 26,000 horsepower, are to be installed. Eventually other units will be added, bringing the total capacity of the plant to 80,000 horsepower.

2—Enlarging and lining of 25 miles of the El Dorado ditch from the forebay above new power house to point on American River near Kyburz, just below mouth of Silver Creek, which carries the water of Twin (Caples) and Silver lakes into the American.

3—Construction of penstocks. The water wheels in the power house will operate under a 1900-ft. drop which will make this one of the high-head plants of the country.

4—Enlargement of Twin Lakes to create 16,000 acre-feet of storage.

5—Construction of diversion dam in the South Fork of the American River at head of El Dorado ditch, just below Kyburz.

6—Construction of double transmission line to connect new plant with present transmission system.

Constitutionality of King Tax Bill Is Attacked

The constitutionality of the King Tax Bill, sometimes known as the "corporation tax bill," passed by the California State Legislature last year, has been attacked in a suit filed in Sacramento by the Los Angeles and Salt Lake Railroad Company, for the recovery of \$127,738.40 for taxes paid under protest. This is the first of several suits to be filed against the measure, according to attorneys who are representing the railroad company. Practically every large corporation in the state paid taxes this year under protest.

The suit sets forth five points upon which it bases its allegation as to the unconstitutionality of the measure and supplements these with reasons in support of the contentions.

The following five points are set forth in the complaint as a basis for the attack upon the act:

First—That the enactment of the legislature approved March 5, 1921, denies plaintiff the equal protection of the law, contrary to the provisions of the constitutions of the state of California and the United States.

Second—That it deprives the company of its property without due process of law.

Third—That it results in the taxation of the operative properties of the company within California not in proportion to their value, but greatly in excess thereof, contrary to section one, article thirteen, of the state constitution.

Fourth—That it results in an interference with, the placing of an undue burden upon, the obstruction of, and the regulation by the state, of commerce, foreign and interstate.

Fifth—That no equalization of the company's taxes or assessments upon its operative property as compared with taxes and assessments upon other property within California or upon operative property of other railroad companies in the state has been made, nor opportunity for such equalization afforded.

Contracts for the construction of the building which will house the exhibits of the United States at the Brazilian exposition, which is to be held at Rio de Janeiro next September, have been let by the government.

Books and Bulletins

A Life of George Westinghouse

By HENRY G. PROUT, C.E., A.M., LL.D. 6½ by 9 inches. 375 pages. Nine illustrations. Charles Scribner's Sons, New York.

For many years it has been advocated that the Society of Mechanical Engineers ought to publish the lives of some of its great men. The Life of George Westinghouse marks the second volume of a series which promises to do this.

Lord Kelvin once said: "George Westinghouse is in character and achievement one of the great men of our time." This compilation of the facts of his active life as recounted by his closest friends and associates—he left no written record of his life—verifies Lord Kelvin's statement. In the manufacture of power and in the development of transportation George Westinghouse stands out as one of the apostles of democracy. Few men have led a more active life. Few men have more actively participated in the business, engineering, financial and commercial affairs of as many large companies located in a score of countries thousands of miles apart.

The book is the logical presentation of the activities of a man whose work was as varied as that of the great engineer. It would be difficult to handle the matter chronologically, for there were times when he was engaged in a number of enterprises equally momentous. So the author has taken each of the many topics around which his life was woven and has treated them separately.

Nor has the volume suffered from this manner of presentation. Any volume setting down the life of a man who rises from comparative obscurity to a pre-eminent place among the engineers and industrial leaders of America would be interesting reading. As a fascinating record of such a life; as an intimate disclosure of many of the heretofore unrevealed episodes of his career; as an inspiring analysis of the engineer's part in the advancement of modern civilization, this book must be recognized as an unusual contribution to the literature of the age.

The Allis-Chalmers Manufacturing Company, Milwaukee, has recently issued Bulletin No. 1119, describing high pressure condensing steam turbine and generator units. The bulletin contains a very complete description of the units manufactured by the company which is profusely illustrated with diagrams and illustrations of actual installations. It also includes a set of general instructions on turbine operation as well as recommendations on adjustments.

Moody's Investors Service, 35 Nassau Street, New York City, announces the publication of a new Rating Book or Analysis of Public Utilities. The book combines the features of a manual on public utilities with those of a rating book, performing the same function in respect to the investment standing of securities as the credit agency books do on credits. Descriptions of properties, full information regarding earnings, finances, officers and directors of each company are given.

Cooperative Campaign to Sponsor Course in Salesmanship

Classes in retail salesmanship for the purpose of increasing the sales ability and sales knowledge of clerks in the electrical industry will be instituted by the California Electrical Cooperative Campaign in San Francisco on March 6. The first series of classes will extend over a period of three months and will be held primarily for clerks only. It will be limited to twenty-five. The classes will be held every Monday night during March, April and May in the assembly hall of the Pacific Building in San Francisco.

Mrs. H. W. Fleming, a graduate of Smith College and the Prince School of Education in Store Service, and the holder of a degree of master of education from Harvard University, will be in charge of the classes.

Approximately one hour of the class will be given over to intensive instruction in the principles underlying the retail selling of electrical merchandise and store service. The remaining time of each session will be devoted to discussion by recognized authorities of the electrical industry of subjects intimately connected with the work of electrical retailers.

It is planned to perpetuate the classes with a view of ultimately encouraging the proprietors themselves to enroll.

Sespe Light and Power Company Announces Development Plans

Plans incident to the financing and construction of the Sespe Light and Power Company's irrigation and water power projects in Ventura county, California, have been completed following a contract entered into by the power company and the Shattuck Construction Company, which offers to supply funds for the completion of the project. The project contemplates a series of dams and reservoirs in the Sespe and Piru rivers.

The first unit to be constructed is known as the Hammel reservoir and power plant and the Bradfield reservoir and plant. The former will store 1,000 acre-feet of water and will generate a maximum of 7000 horsepower. The Bradfield plant will consist of two 9500-horsepower units with an auxiliary unit of 4500-horsepower capacity.

The power to be developed will be distributed largely to the farmers in Ventura county for irrigation purposes. It is said that a contract has also been entered into with the Southern California Edison Company for the sale of any surplus power which is developed.

The gaining importance of the copra crushing business in the Northwest is demonstrated in the report of the Portland Vegetable Oil Mills Company for the first two months of its operation. The plant opened December 21, 1921, and the first shipment was made during the first week of January. During that month a total of 27 carloads of oil was sent out and orders were booked for 100 cars during February, most of which were filled. Future delivery orders amount to more than \$500,000 in addition to the by-products of the plant, which will be sold locally for stock feed and will yield returns in excess of \$50,000.

Utah Manufacturers Oppose New Industrial Lighting Code

Opposition to the adoption at the present time of a proposed industrial lighting code by the industrial commission of Utah, has developed to a considerable extent among a number of the members of the Utah Manufacturers' Association.

At a meeting held on February 13th, at the state capitol at Salt Lake City, which was presided over by G. R. Yearsley, chief factory inspector for the Utah Industrial Commission, and which was attended by a committee from the Utah Manufacturers' Association, it was decided that no agreement could be reached as to terms of the proposed measure, but that the protest of the members of the association should be presented to the commission some time in the near future.

The arguments presented by the manufacturers were based largely on the claim that considerable expense would be incurred to them at a time when expense is hard to bear.

Mr. Yearsley introduced reports, in support of the code, showing that experience with the lighting code elsewhere had proved that the establishment of proper lighting conditions was of economic benefit to the industry on account of increased production and elimination of much waste.

It is expected that no definite action in regard to the matter will be taken at the present time.

Rights of Power or Irrigation Interests Questioned

Controversies over the relative rights of power and irrigation interests in the use of the water of the Yuba River have developed in a series of hearings recently held in San Francisco before F. H. Fowler, district engineer of the Federal Forestry Service and H. A. Kluegel, chief of the water rights division of the State Department of Public Works. The Yuba Development Company and the Excelsior Water and Power Company are both seeking water rights on the Yuba River while farmers of the Nevada Irrigation District contend that they have prior rights to the water. The Yuba Development Company contemplates a series of dams and reservoir for the primary purpose of irrigation, the entire project to cost \$27,000,000. The Excelsior Water and Power Company proposes to construct three reservoirs, seven miles of tunnels and six power plants. The power would be sold to mining companies in this section of the state. The project contemplates the expenditure of approximately \$25,000,000. Both companies are said to be backed by eastern capital.

No decision was reached in the matter by either the state or the federal authorities before whom the hearings were held.

Freezing of the city water pipes and mains at Yakima, Wash., will be remedied by injecting superheated steam into the reservoirs, according to officials of the Pacific Power and Light Company, which furnishes the city with water. A boiler has been erected at the edge of the reservoir and will be operated night and day.

Meetings of Interest to Western Men

New Mexico Electrical Interests Hold Annual Convention

Members of the New Mexico Electrical Association held their annual convention at Albuquerque on February 13 and 14 with fifty delegates and visitors attending. The meeting was one of the most successful in the history of the organization both in the matter of the program and of attendance.

The program follows:

Monday morning:

Address of welcome by James N. Gladding. Response by D. E. Bent of Tucumcari. President's annual address, Arthur Prager of Albuquerque. Reports of secretary and treasurer. Committee reports. Address, "The Goal and Value of Budgeting," by O. A. Weller, president of the Rocky Mountain division, N. E. L. A., of Denver. Discussion.

Monday afternoon:

"Some Central Station Losses," by Prof. C. E. Carey of the state university. "Lighting the Home," by George O. Hodgson of Denver. "General Station Matters," by W. P. Southard of Trinidad, Colo. Two reels of especial interest to electrical men were then shown at the Crystal theater.

Tuesday morning:

"Electrical Merchandising," by J. J. Cooper of Denver. "Humanizing Public Utilities," by George E. Lewis of Denver. "Some Modern Ideas of Electricity," by Prof. R. W. Goddard of the state college.

Tuesday afternoon:

"Relation of Wireless to Central Stations," by L. D. O'Connell of the Westinghouse Electric and Manufacturing Company, El Paso. "Central Station Advertising," Mr. Schram of Roswell. General discussion of the relation of New Mexico utilities to the Rocky Mountain division of the National Electric Light Association. Informal talks. Election of officers. General discussion.

Denver Cooperative League Holds Successful Theater Party

The Denver Electrical Cooperative League extended its activities to the social side when on February 20 it held a theater party at the Empress Theater in Denver.

The double purpose of the entertainment was to get the industry as represented by all the electrical men, their families, employes and friends, together as part of the regular monthly program of the League and to thoroughly entertain the audience with the regular vaudeville bill and special high-class acts from the industry.

R. H. Edwards, prominent Denver electragist and singer of note appeared, also Walter Tripp of the Hendrie and Bolthoff Mfg. Co. in specialty numbers.

"Back of the Button," the N. E. L. A. moving picture film, and other "movies" of electrical industry were shown.

The ulterior purpose in giving the show was to secure additional funds to advertise the Electrical Home which will be opened in Denver early in April.

Clarence Keeler, Alex Hibbard and J. W. Ryall, the League entertainment committee, were responsible for the success of the party.

Salt Lake Engineers Organize Employment Bureau

The Salt Lake chapter of the American Association of Engineers has opened headquarters in the Deseret Bank building, with an officer of the local chapter in charge.

An important part of the work of the chapter now is the operation of the employment bureau, which is conducted without charge to either employer or employee. The chapter officials have listed most of the engineers of the state and are enabled to give accurate data on the qualifications of each, and to tell where he is to be found. In this way the bureau supplies the needs of employers of engineers promptly and fills positions with men who fit into them.

In addition to the employment feature of the chapter the committees of the association are working on the details for the national convention to be held at Salt Lake June 5, 6 and 7. These committees already have their work well in hand, and promise that the convention will be one worth while to visitors and also to the people of Salt Lake. The program of entertainment will include trips to interesting parts of the state.

The San Francisco section of the American Association of Engineers has appointed a committee to investigate the details of the proposed California Water and Power Act which will appear on the November ballot. The committee is composed of the following engineers: J. J. Rosedale, Industrial Accidents Commission, E. E. Carpenter, consulting engineer, George Mattis, Oakland city engineer, Charles H. Lee, consulting engineer and former head of the water rights division of the State Department of Public Works, and Donald M. Baker of the Water Commission.

Los Angeles and San Francisco Organizations Elect

Both the San Francisco Electrical Development League and the Los Angeles Electric Club have elected officers for the new year. K. E. Van Kuran, district manager of the Westinghouse Electric and Manufacturing Company, will be in charge of the destinies of the Los Angeles club, while R. A. Balzari, manager of the Industrial division of the San Francisco office of the Westinghouse company, will head the San Francisco organization.

Other officers of the Los Angeles club follow:

Vice-president, W. L. Frost, Southern California Edison Company; vice-president, H. L. Miller, H. L. Miller Company; vice-president, D. W. Pontius, Pacific Electric Railway Company; secretary and treasurer, C. E. Listenwaller, Listenwaller & Gough; sergeant-at-arms, J. E. MacDonald, Joint Pole Committee. Executive committee—P. H. Booth, Edison Electric Appliance Company; H. W. Allen, Graham-Reynolds Electric Company; E. R. Northmore, Los Angeles Gas and Electric Corporation; Frank Van Vranken, Los Angeles Railway Company; B. G. Wright, Southern California Telephone Company; H. B. Woodill, Woodill-Hulse Electric Company; Harry Harper (ex officio), Western Electric Company.

The remaining members of the slate which heads the San Francisco Development League follow:

Louis F. Leurey, electrical engineer, first vice-president; W. B. Sawyer, United States Steel Products Company, second vice-president; J. W. Mahoney, General Electric Company, secretary-treasurer; directors, Warren H. McBryde, California and Hawaiian Sugar Refining Corporation, Frank W. Smith, Great Western Power Company, Carl B. Kenney, NePage McKenny Company, and Grover A. Anderson, Electric Appliance Company.

Idaho Irrigationists Will Form One Large Water District

Formation of one great irrigation district to comprise all districts except those with their own irrigation systems was decided on at a recent meeting of representatives of irrigation companies and districts in southern Idaho. This decision was taken through the adoption of resolutions offered at a banquet to 150 delegates.

It is believed that the organization of one large district will be the first step in a campaign which will result in assuring the undertaking and completion of the American Falls project by the federal government.

Preparatory to uniting of the separate districts a thorough campaign of education will be prosecuted under the direction of the Idaho Reclamation Association. Manager Guy Flenner is making plans to send representatives of the association into all districts.

At a recent meeting of the various related interests of the building industry in Seattle, including electrical jobbers and dealers, plumbing and heating contractors, architects and engineers, lumber manufacturers, and financiers, a permanent organization to be known as the Washington Association for Building and Construction, was formed. D. R. Huntington, architect, was elected chairman, and W. Hutton, secretary, to serve until election of officers. J. J. Agutter, electrical contractor, R. G. Emerson of the Northwest Electrical Service League, and Sam Hunter of Sam Hunter Co., Inc., building materials, were named to serve on a committee to formulate a constitution and by-laws.

COMING EVENTS

MONTANA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Annual Convention—Butte—March 6-7, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

OREGON ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Mid-winter Convention—Corvallis—March 2 and 3, 1922

Captain John D. Fredericks, the newly elected president of the Los Angeles Chamber of Commerce, is a natural born and reared enthusiast. The thirty-one years of California life have served to intensify the broad vision and love of accomplishment that the student, athlete, and scholar of Washington and Jefferson College had worked for and thrived in, during college days in the late '80's. Captain Fredericks was born in the same county in Pennsylvania that admits to fame because of this same university just mentioned.



J. D. FREDERICKS

Following graduation he came to Southern California and while teaching school he took up the study of law. In this he has continued to date, with the exception of time spent in the service of his government during the Spanish-American War, acting as adjutant in the 7th California Volunteers. Many acts of his term of office pay tribute to the highest of ideals in the conduct of the judicial branches of the county, state, and national government. Ardent lover and believer in the value of all educational activity; a man possessing the characteristics of natural leadership; with the physique and stamina to work unceasingly for accomplishment, he should make an enviable record as leader in this, one of the largest Chambers of Commerce in the United States.

W. M. Shepherd, assistant to the manager of the California Oregon Power Company, is a recent Portland visitor. The activities of the California Oregon Power Company have been moved from San Francisco to Medford, Oregon, where this company is extending its big transmission lines up into the Willamette Valley, as previously announced in the columns of *Journal of Electricity and Western Industry*. It is believed that the activities of Mr. Shepherd and his company will do much for the opening up of new agricultural and industrial development of southern Oregon.

Dr. Elwood Mead, member of the faculty of the University of California and head of the California Land Settlement Board, will go to Hawaii in the near future to advise with the Hawaiian Homes Commission in the movement which has been instituted to rehabilitate the rapidly vanishing Hawaiian race.

Personals

Lars Jorgensen, a consulting engineer of San Francisco, has returned from a trip of several months' duration in European centers. Mr. Jorgensen has been in close touch with the engineering situation in Czecho Slovakia, where he went as a consulting engineer for the Czecho Slovakian government to make a report on the rehabilitation of that section of Europe.

W. L. Goodwin, assistant to the president of the Society for Electrical Development, Inc., with headquarters in New York City, who is well known to members of the electrical industry throughout the West, is beginning to show powerful results for good in his reorganization work in the Society's activities. Mr. Goodwin has placed in the employ of the Society a number of experts in the gathering of statistical information, particularly relating to the uses of electricity in the home, which cannot fail to bring helpful results to the industry as a whole.

John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company, has been asked to deliver a lecture before Princeton University on April 4th covering the utility situation and development in the West. This is to be the conclusion of a notable series of appearances of public utility men before Princeton University, among them being Samuel Insull, Frank Edgar and W. B. McCall, all nationally known figures in the electrical industry.

Fred A. Noetzi, chief engineer, Beckman & Linden Engineering Corporation with headquarters in San Francisco, has returned from an absence of four months, spent largely in European rehabilitation centers where he particularly studied the situation in Austria.

E. E. Browne, president of the California Association of Electrical Contractors and Dealers, is busily engaged in appointing his committee and in formulating ideas as to how the new trade mark and slogan for the upbuilding of the California Association may be best put into practice. The Sacramento meeting was one of the most successful in the history of the Association, and it is believed that activities for the coming year will measure well up to those of former years.

Robert Sibley, as vice-president of the American Society of Mechanical Engineers and vice-president of the American Institute of Electrical Engineers, was able to secure during December the promise of the two great national organizations to hold their annual convention at Portland, Oregon, during the great exposition year of 1925, and these two conventions are now listed on the docket, and it is believed that international interest will be aroused in the forthcoming engineering conventions at Portland during the convention year.

N. Abrams, manager of the Western Agencies, San Francisco, is now on an extended trip throughout the East, where he will visit the various manufacturers whose products are distributed in the West by his organization.

J. Malcolm Muir, vice-president and general manager of the McGraw-Hill Company, Inc., of New York City, is a recent San Francisco visitor. Mr. Muir comes to the Pacific Coast to personally investigate the great construction activity in engineering achievement that is under way in the West at the present time, and is enthused over the possibilities of this section as one of the great future commercial and industrial centers of the world.

F. E. Johnson, sales engineer of the M. W. Kellogg Company, is a recent San Francisco visitor, having returned from an extended trip to Japan and Formosa. Like W. M. White, chief hydraulic engineer of the Allis-Chalmers Company, Mr. Johnson has recently had an exciting trip into the head hunter country while in the wilds of Formosa, and has many interesting tales to tell of engineering development and the difficulties involved in the Far East in putting over these activities.

George W. Evans, Seattle consulting mining engineer, has been chosen by the Union Pacific Coal Company, operators of twenty-two mines in Wyoming, to make an official examination of its properties. Methods of mining now in vogue will be investigated and suggestions for improvements will be made by Mr. Evans.

I. W. Alexander, for several years in charge of the securities and advertising departments of the San Joaquin Light and Power Corporation, has resigned from the company to become resident manager of the newly established Fresno branch office of the firm of Blythe, Witter and Company, a California investment house. Mr. Alexander joined the publicity and advertising departments of the power company eight years ago. He was formerly a newspaper man. Two years ago, when the



I. W. ALEXANDER

company undertook an extended securities campaign, he was placed in charge of this activity and since that time has done much toward forwarding the idea of customer ownership of public utility securities in California. While his loss to the electrical industry will be keenly felt, he is to be congratulated on his new appointment, which recognizes the confidence placed in him by thousands of investors in public utility securities in the San Joaquin valley.

Max Loewenthal, president of the Globe Commercial Company of San Francisco, manufacturers' representatives, and secretary of the Pacific Radio Trades Association, has gone to Washington, D. C., to represent the coast organization in the government's radio conference. The meeting has been called to discuss the problems of wireless congestion, which have become excessive due to the thousands of amateurs in the field.

F. F. McCammon, in charge of power sales for the Denver Gas and Electric Light Company, is receiving congratulations for having secured the largest single industrial load yet to be added to the central station lines. The Beatrice Creamery of Denver will furnish the load, which will be in excess of 1000 horsepower.

Arlington M. Smith, Evan Fisher, Henry R. Haines and Henry Fisher, Jr., all formerly connected with the Southern California Edison Company on the Big Creek Development, have formed the Western Engineering Company, practicing and supervising engineers with offices at 220 Brower Building, Bakersfield, for the purpose of conducting surveys, reports and investigations on mining, irrigation and hydroelectric projects.

O. L. Mackell, of the Denver Gas and Electric Light Company, has been appointed a central station representative on the advisory committee of the Denver Electrical Cooperative League.

Charles Wiggin, of Dunham Carrigan and Hayden, with headquarters at San Francisco, has been elected president of the Pacific Coast Division of the National Electrical Supply Jobbers' Association. This news will be received by men of the electrical industry with gratification in that Mr. Wiggin has for years been recognized as one of the outstanding men who has through faith-



CHARLES WIGGIN

fulness and consistency in purpose contributed a substantial share in the upbuilding of this well known western activity. It is believed that the industry generally will give Mr. Wiggin the whole-hearted support he deserves in putting over the best year ever in the activities of the Pacific Coast Jobbers' Association. The informal view here-with shows "Charlie" in that winning way of his, watching the "little birdie" come out of the camera.

Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia, is a recent San Francisco visitor, having come to California on a combined business and pleasure trip. Mr. Chatfield conferred with leaders in the electrical industry in this state on the forwarding of the co-operative movement and reports that rapid strides are being made in the Northwest in this field.

Whitney L. Boise, of the Portland Chamber of Commerce, represented Oregon at the annual meeting of the Water Power League of America which met in New York recently. The entire question of power development in the United States was discussed at this conference, with particular reference to the formation of super-power zones. Mr. Whitney also represented Oregon at Washington as one of the delegates from the Western States Reclamation Association appearing in behalf of the McNary-Smith reclamation bill.

Paul B. McKee, general manager of the California Oregon Power Company, has recently returned from a visit of several weeks in business centers of the East.

L. T. Merwin, general superintendent of the Northwestern Electric Company of Portland, is a recent San Francisco visitor, where he conferred with California central station company officials and attended to other matters of business in conjunction with the activities of his company.

P. D. Kline, vice-president and general manager of the Wisconsin-Minnesota Light and Power Company of Eau Claire, Wisconsin, is a recent San Francisco visitor. While in the West, Mr. Kline inspected many of the larger hydroelectric projects and commented upon the rapid strides which have been made in this section of the country in the matter of high tension transmission.

J. S. Thompson, president and general manager of the Pacific Electric Manufacturing Company of San Francisco, has left for an extended visit to the East where he will investigate high tension equipment similar to that manufactured and distributed in the West by his company.

Willis T. Batcheller, consulting engineer, who for the past ten years has been connected with the City of Seattle as a hydroelectric engineer, has just completed a report for the state of Washington on the Columbia river pumping and power project. This project contemplates the irrigation of some two million acres of arid land in the central part of the state by means of water pumped from the Columbia river into a coulee which will form the main supply canal. About a million and a half horsepower will be required for pumping purposes and additional amounts of commercial power up to one million horsepower can be economically developed on the proposed site.

E. L. Bowler, formerly district manager at Tulare for the Southern California Edison Company, has been transferred to Los Angeles to become chief clerk to the vice-president. As a result of this change, L. S. Tudor becomes district manager at Lancaster and J. N. Haskin moves from Lancaster to Tulare to take the position made vacant by Mr. Bowler's transfer.

Stuart Mannell, manager of A. G. de Sherbinin and Company, Seattle, importers, exporters and engineers, has recently been elected president of the Seattle Engineers' Club to succeed J. Thomas Dovey. While not a graduate engineer, Mr. Mannell has been identified with engineering, mining and construction projects since coming to the Northwest from Ontario in 1897. He spent eleven years in the Yukon district of Alaska in mining and construction work and for the past thirteen



STUART MANNELL

years has been one of the most active figures in engineering circles in Seattle. For the past seven years he has participated in the affairs of the Engineers' Club and preceding his election to the presidency, served as chairman of the board of trustees of the organization.

Obituary

William J. Barker, vice-president and general manager of the Denver Gas and Electric Light Company, one of the foremost figures in the electrical industry in the Intermountain district, died of pneumonia on February 15. One of the pioneers in the central station field in the West, Mr. Barker came to the United States from England in 1870. Ten years later he came to Denver as chief engineer for the Colorado Electric Company, the company which obtained the first lighting franchise in that city. He has been identified with the activities of the city's central station since that time. Indicative of his activity in the civic and commercial affairs of the city is the fact that he was a member of the Denver Civic and Commercial Association, the Denver Athletic Club, the Denver Club, the Denver Motor Club, the Rocky Mountain Country Club and the Denver Press Club. He was also a member of various Masonic organizations and the Elks. He was one of the mainsprings of the Denver Electrical Cooperative League and was head of the corporation which is building the first electrical home in that city. His loss will be keenly felt, not only by the members of the electrical industry with whom he was closely associated, but also by the thousands in Denver whom he has aided by his benevolence.

The Bowie Switch Company, San Francisco, manufacturers of high tension circuit breakers, switches, cutouts and transmission line equipment, has just issued Bulletin No. 14 describing a new type of expulsion-tube fuse for protecting transformers and transmission lines.

The Rutenber Electric Company, Marion, Ind., manufacturers of the "Marion" line of electric heating and cooking appliances, announces several improvements on its Model 30 hot plate which include cast aluminum frame and legs in place of cast iron. The weight of the two unit plate is reduced ten pounds.

The Wodack Electric Tool Corporation, Chicago, manufacturers of drills, hammers and grinders, has perfected a new portable drill and grinder, designed to be used in plants or shops where there is insufficient demand for a separate drill or grinder. The total weight of the instrument is 18 pounds, the motor has two speeds and develops $\frac{1}{2}$ hp.

Cote Bros. Manufacturing Corporation, Chicago, has secured the approval of the National Board of Fire Underwriters for the new refillable plug type fuses which the company has perfected.

The Westinghouse Electric and Manufacturing Company has issued special publication No. 1644, "A Review of Electric Railway Problems of 1921." This publication is profusely illustrated as an aid to the discussion on the various problems of electric railway operation which it contains.

The Cutler-Hammer Manufacturing Company, Milwaukee, has added to its line of canopy switches a very shallow type of rotary switch less than one inch in diameter. It is designed for use in shallow wall brackets. The rating is one-half ampere, 125 volts.

The Killark Electric Manufacturing Company, St. Louis, manufacturers of fuses and conduit fittings, has issued a regular sheet which has attached to it a condensed catalog sheet giving prices, carton quantities, standard package quantities and catalog numbers. All the information formerly included on twenty-four sheets has been placed on one.

Harry Arthur, of the Enterprise Electric Co., had a booth at the Industrial Exposition recently held in Denver. A. R. Woolley of the Edison Electric Appliance Co. helped him display the Hotpoint line.

The Emerson Electric Manufacturing Company, St. Louis, Mo., is placing on the market for 1922 a new type of alternating current fan motor. It will be known as the Emerson Junior, and owing to certain refinements such as the elimination of speed control, swivel, etc., will be offered at popular prices. Bulletins No. 4021 and 4022 describe the 1922 products of this company.

The Mountain States Machinery Company of Denver was represented at the New Mexico Electric Light Association convention at Albuquerque by Walter Wells.

Albert Sechrist, head of the Albert Sechrist Manufacturing Company of Denver, has just returned to that city after an extended eastern tour in the interest of the electric pressure cooker patented and manufactured by his company.

Manufacturer, Dealer, and Jobber Activities

The Superior Machine Company, De Kalb, Ill., owner of the cooling swinging wringer patents and manufacturers of the Superior oscillating type washing machines, has recently been purchased by the Hurley Machine Company of Chicago. The Superior Company will continue to manufacture and merchandise its products as formerly.

The Federal Porcelain Company, Carey, Ohio, has just issued Catalog No. 2 covering the standard line of electrical porcelain manufactured by it. In addition to fully covering the company's products the catalog is a ready reference book for the purchaser of porcelain. The catalog will be distributed upon request.

The P. A. Geier Company of Cleveland has announced an extensive advertising program for Royal vacuum cleaners for 1922. Besides more than the usual amount of space in the business and trade papers, various popular magazines will carry direct to the purchasing housewife the message of the time-saving, labor-saving electric cleaner.

Day and Zimmerman, Inc., engineers of New York, Philadelphia and Chicago, have issued an artistic booklet on the Front Street Plant of the Erie Lighting Company which was designed by them and constructed under their supervision. Results of actual performance at this station add to the value of the booklet.

The consolidation of the Richardson-Phenix Company of Milwaukee with S. F. Bowser and Company, Inc., Fort Wayne, Ind., has resulted in no change in the Pacific Coast representatives of the two companies. Theo F. Dredge will continue as Pacific Coast representative for the Richardson-Phenix division of the Bowser company, while the interests of the latter concern will be handled in the West by E. M. Savercool as western manager, and E. C. Marsh as assistant manager. The district offices for both concerns are located in San Francisco.

The Refrigo Corporation, Milwaukee, announces the perfection of a small automatic refrigeration unit which can be used in conjunction with any type of household refrigerator. The device is electrically operated and may be placed on top of the refrigerator or in the basement as the owner sees fit. Included in the innovations which the company claims for the new device are its freedom from leaks and the quality of the thermostat which operates the ammonia pump. A bulletin covering the device has been issued by the manufacturers.

A. L. Myers of Myers and Swartz, San Francisco manufacturers' representatives, has recently returned from an extended trip to eastern manufacturing centers.

Cote Bros. Manufacturing Corporation, Chicago, makers of simplicity refillable fuses, have established branch offices at New York, Philadelphia, Boston, Cleveland, San Francisco, Tampa and Denver during the past month.

H. G. Weeks, president of the Weeks Manufacturing Company, Hamilton, Ohio, manufacturers of electric ranges and appliances, is visiting Pacific Coast cities investigating the market for the products of his company.

Dwight F. Robinson and Company, Inc., with which is consolidated Westinghouse, Church, Kerr and Company, engineers and constructors, has moved its Los Angeles office to 1111 Hollingsworth Building. The office is in charge of C. C. Thomas, western representative.

W. C. Ross and D. H. Potter have taken over the business of the Brownell Electric Company at Baker, Ore. The new store has been incorporated under the name of the Baker Electric Supply Company.

The Altorfer Bros. Company, Peoria, Ill., manufacturers of A B C washing machines, announces the development of a full-size oscillating type washer to retail at popular prices, \$105 west of the Rocky Mountains.

The Delta-Star Electric Company, Chicago, Ill., is distributing Bulletin No. 32, describing a complete line of outdoor high tension switching and protective equipment of the unit-type design. A copy will be sent upon request.

The Arrow Electric Company, Hartford, Conn., has prepared a fuse box chart for distribution among contractor-dealers to be placed in the fuse box of newly wired homes to aid the householder in locating the fuses for the various rooms of the house. The charts contain a space for the contractor-dealer's name and address. They may be obtained in lots of fifty or less from Arrow jobbers and in larger quantities, containing any printed matter the dealer designates, from the Arrow headquarters at a nominal charge.



SUSPICIOUS

If you were a prohibition officer and you saw a man holding a package shaped like the one which is reposing in the hand of Arthur E. Rowe, sales manager for Garnett Young and Company, San Francisco, would you search his hip pocket? We are not naturally suspicious but we wonder if "Art" is just going to, or coming from a meeting of the San Francisco Electrical Development League, where he is one of the "moving spirits."

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Indications are that during the succeeding months, there should be an ample supply of credit for agricultural, industrial, and commercial purposes at moderate interest rates.

Building activities continue to increase in San Francisco, although for the most part they are still confined to office and business structures, thus leaving the housing shortage acute, with rents high. Skilled building mechanics are in demand and the United States Department of Labor reports that pay-rolls in San Francisco increased 14.8 per cent in January. In the wholesale trade, the volume of sales in most lines is reported in excess of sales for January, 1921; groceries did not come up in value to sales a year ago by about 15 per cent; but plumbing supplies and building materials report an increase both in volume and value of sales. Most retail lines also show an increased volume over January, 1921, of from 30 to 40 per cent—with values approximately the same. Collections are good.

Shipping has not picked up to any great extent, but there is a good deal of repair work going on. Export business with the Orient is fair.

LOS ANGELES

Building departments report February permits for half-month of February exceed the entire month of last year. During the first fourteen days of the month 1475 permits were issued with estimated valuation of \$4,785,365. There is a perceptible increase in the permits issued for business structures.

Money to loan for building mortgages is more plentiful than at any time during the past year. Banks and loan departments of insurance companies are taking active steps to supply the demand.

The full economic value of the rainfall to date is becoming apparent as the ground-water table is found to be several feet higher than at any time in recent years. This will be reflected in lower costs for pumping during the coming season and when combined with the reduced requirements for irrigation water will help to compensate for low prices and any citrus crop shortage due to the freezing weather in January. Vegetable crops have not recovered from the damage of last month and the available local supply is of inferior quality and at a somewhat higher price than usual.

Retail sales of implements, small tools, hardware lines and electrical goods were much better in January and

February than for the corresponding period last year. A definite upward trend for average sales, in volume, is reported by many representative dealers.

PORTLAND

General business is quiet although it is better than at this time last year. Jobbers find business equal to that of last year with prospects much better than those of a year ago. Retail trade has been affected by rather adverse weather conditions, but the volume is fair. Exports for January totaled \$4,759,460 in value, which is equal to the first month of last year. The building movement is active and prospects for greater activity in the spring are very good. Permits in January aggregated \$1,080,460 in value, which compares with \$646,560 in January of last year. Although the lumber industry appears on the road to a complete revival, business so far this year has not been up to expectations. Production for the week ending February 11 was 11 per cent below normal. Electrical jobbers and contractor-dealers report business quite satisfactory, although contracting is not as good as it will be when the spring building activity begins.

Wheat prices have risen steadily, but not in line with eastern advances. Exports of wheat in the past month were 2,448,906 bushels and the flour exports were 95,445 barrels.

SEATTLE

More than 57,000 men are now working in the mills and logging camps of Washington and Oregon, and according to present indications this number will be greatly augmented before the middle of March. Sawmills of western Washington and Oregon continue a strong and steady production, cutting 87 per cent of their normal full-time capacity.

Building operations on the scale heretofore predicted, have started to materialize, and had it not been for inclement weather, the spring program would be nicely started. As it is, there is a considerable amount of new building, including an encouraging number of new residences.

Merchants report a very gratifying volume of business for the months of January and February, and express the firm belief that the spring will show a definite return to normal buying on the part of the public. Prices on nearly all lines of merchandise have shown a decrease, which has been the prime means of stimulating buying. Unemployment conditions are showing further improvement.

SALT LAKE CITY

Business is still "marking time" in the intermountain section, and there is no material change. Severe winter weather has retarded building operations, but considerable work is planned along this line as soon as spring opens up. Bankers report that there is little call for money at present. One very favorable condition is the increase in wool prices, which it is believed will result in easier money throughout this section, and materially increase the buying power of the wool growers. Retailers in all lines are stocking up for spring business and are looking forward to much better conditions than have existed for the past year. Electrical goods are not moving very rapidly, but this situation also is expected to improve materially with the coming of spring. An upward trend in produce prices has created a feeling of encouragement among the farmers. The unemployment situation still remains a serious problem, with, however, some slight improvement. The mining situation is practically unchanged, with no definite date set for the re-opening of the Bingham copper mines, although it is felt that this is not very far off. The Utah Steel Corporation, at Midvale, Utah, has re-employed approximately 100 men during the past thirty days, with indications that more will be added in the near future. Collections are slightly easier, although no appreciable change is noted.

DENVER

Indications as to the immediate outlook here are shown by the statements of Governor O. P. Shoup. "The people are talking better times and getting ready for increased business. So far as Colorado is concerned we have not felt the depression that was experienced in the East. Our industries are so diversified that unemployment has been comparatively small. These industries are receiving increased orders and the whole business situation is clearing up. Federal loans arranged for by a thoughtful and sympathetic administration in Washington have been helpful to our cattlemen. Agricultural conditions, I think, are showing gradual certain improvement."

The Denver Real Estate Exchange has launched an extensive advertising campaign, pointing to a population of 500,000 by 1930.

Voluntary buying in nearly all lines is still low. The movement of all types of electrical equipment and merchandise is slow. With no cessation in building activities, however, there is every reason to believe that the demand will increase.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC CENTRAL DISTRICT

SAN FRANCISCO, CAL.—The Mineral Metal and By-Products Co., American National Bank Building, has purchased 1372 acres of tidelands off the San Mateo shore where it plans to erect a plant.

FRESNO, CAL.—The Raisin Growers' Association has announced its plans for the erection of a fireproof office building at the intersection of Inyo and L Streets. The cost is estimated at \$150,000.

FRESNO, CAL.—Mrs. Blaine Rogers and her brother J. Patterson have bought the Forsyth property on the corner of Tulare and J Streets and will build an 8-story office building. The estimate calls for \$600,000.

NAPA, CAL.—Approximately \$100,000 will be spent on improvements and new buildings at the Napa State Hospital. The work will be done under the supervision of the Engineering Department at Sacramento.

FRESNO, CAL.—The San Joaquin Light & Power Corporation will start construction about April 1st on an extensive power development project requiring seven years to complete and involving an expenditure of over \$25,000,000.

SAN FRANCISCO, CAL.—J. C. Brickell is erecting a two-story building on Sutter Street between Sansome and Montgomery Streets, to be occupied by Coldwell, Cornwall & Banker, real estate dealers, who have taken a ten-year lease.

FRESNO, CAL.—According to the announcement of architect Eugene Mathewson the new building for the Brix estate will be 6-story, Class A, office and stores, and will cost \$300,000. Bids will be called for at an early date as the plans are ready.

SAN FRANCISCO, CAL.—The Petri Italian-American Cigar Co. is planning the erection of a four-story factory building on the northwest corner of Vallejo and Battery streets. The building will be of concrete and steel. A. Petri is president of the company.

SACRAMENTO, CAL.—The State Highway Commission has allotted the sum of \$150,000 for the improvement of a road east from Willows to Glenn, in Glenn county. Of this sum, \$50,000 will go towards constructing a bridge over Stony Creek on the Orland-Chico road.

SAN FRANCISCO, CAL.—The Los Angeles Soap Co. has purchased unimproved property on the northeast corner of Second and Brannan Sts., for \$50,000, where a three-story factory will be erected. Plans have been drawn by W. H. Crim, Jr. Estimated cost is \$150,000.

SAN FRANCISCO, CAL.—Plans are being prepared by W. H. Crim, Jr., architect, for a new Christian Science church to be erected on the southeast corner of Divisadero and Clay Streets. The building will be of Class "C" construction, of concrete and plaster, with terra cotta columns.

LODI, CAL.—The Western States Gas and Electric Company is planning to connect Lodi with the Pacific Gas and Electric Company lines and the auxiliary steam plant at Stockton for emergency use. The list will cost approximately \$75,000. S. Kahn is vice-president of the Western States Gas and Electric Company.

TRACY, CAL.—The General Milk Co. of California is planning to erect a modern milk

condensery here which will include a reinforced concrete milk evaporating plant building, also boiler and engine room building and a separate warehouse unit. Officials of the company are J. Hughs, Oakland, F. Glass, Berkeley, and G. Davis, Berkeley.

SAN FRANCISCO, CAL.—Dyer Bros. have been awarded a contract for the steel work in connection with the construction of a 2-story steel and brick factory building for the Pacific Embroidery Co., to be erected on the northwest corner of Mission and 13th streets at a cost of approximately \$50,000. A. Burgren, 110 Sutter St., is the architect.

STOCKTON, CAL.—Action was recently taken by the local post of the American Legion to force an early choice by the city council of a site for the Memorial Auditorium to be constructed here. Bonds totaling \$1,200,000 were voted in October, 1920, for the erection of a city hall and auditorium, the latter to be a memorial to the men who served during the war.

SEBASTOPOL, CAL.—Plans for enlarging three packing plants and constructing a new one at Garbro station, were approved by the stockholders of the Sebastopol Apple Growers' Union. Additions will be built to the branch packing houses at Forestville, Healdsburg and Stony Point. Directors of the Growers' Union are E. Merritt, H. Harbino, D. Sinclair and J. King.

OAKLAND, CAL.—A grain elevator that will handle 1,000,000 bushels of grain is planned for the city of Oakland, according to an announcement made by W. H. Heileman, secretary of the California Farm Bureau Elevator Corporation, which will build the new elevator. The company also plans to build from six to ten elevators in the San Joaquin, Sacramento and Salinas valleys.

TULARE, CAL.—Service betterment plans for the Southern California Edison Co. in Tulare county include a number of building programs of which the new pole treating plant and substation in Visalia are a part. The company also plans to build a new substation at Woodville and a substation cottage in Lindsay, also in Porterville. It is reported that \$75,000 will be spent on the Porterville substation this year.

SAN FRANCISCO, CAL.—Work will be started in a few weeks on a seven-story apartment building on the northwest corner of Geary and Leavenworth Streets. The building will be of steel and brick frame construction, exterior finish in classic renaissance style, with terra cotta trimmings, interior finish of hardwood. Two and three-room apartments are planned, a total of 161 rooms in all. Estimated cost, \$300,000. A. F. Rousseau is the owner.

THE PACIFIC NORTHWEST

TACOMA, WASH.—E. N. Kisenower, Carl Gibbers and E. L. Eide have organized the Ajax Electrical Company, National Realty Building.

CHEHALIS, WASH.—The Triumph Shingle Company will rebuild its plant recently destroyed by fire. Plant will have output of 25,000 shingles daily.

SEATTLE, WASH.—The Granby Mining, Smelting & Power Co. is planning the early construction of a huge storage dam at Anyox, B. C., to cost \$350,000.

ELLENSBURG, WASH.—The Union Bridge Co. of Seattle has been awarded a contract to construct a steel bridge across the Yakima river, two miles west of Ellensburg.

CENTRALIA, WASH.—A sawmill with a daily capacity of 25,000 ft. is being erected on the north fork of the Newaukum river by the Wilson Lumber Co., newly incorporated.

SEATTLE, WASH.—The Rainier Electric Bake Oven & Equipment Co. recently filed articles of incorporation, naming Jacob Hied, Peter Hied, Knut Halseth, et al., as incorporators.

YAKIMA, WASH.—The Yakima city commissioners have awarded a contract for the construction of the city irrigation system, which will serve the east side of town, to R. M. Hardy, of Yakima, whose bid was \$193,000.

CHEHALIS, WASH.—The Wilson Lumber Company, Chehalis, incorporated by C. M. Merritt, S. B. Wilson and B. M. Wilson, plans the establishment of a lumber manufacturing plant near Chehalis. Plant will have capacity of 25,000 ft. daily.

TACOMA, WASH.—A petition asking for the formation of an improvement district and the improvement of Commerce Street from South 7th to South 17th Sts. by the installation of an ornamental street lighting system, has been filed with the city council.

KLAMATH FALLS, ORE.—Word has been received here that a government appropriation of \$700,000 has been made at Washington for the Klamath irrigation project. When available, a large portion of the money will go for the development of Tule Lake lands.

KLAMATH FALLS, ORE.—Immediate construction of 115 miles of high tension transmission line from the Prospect power plant on the Rogue river to Eugene, Ore., to supply electric current to the Mountain States Power Co., has been announced by California Oregon Power Co.

SEATTLE, WASH.—Plans for the erection of a three-story addition to the present plant of the Rattan Furniture Manufacturing Company, 2648—15th Ave. West Seattle, are being prepared by Architect Stephens, Stephens & Brust, New York Block, Seattle. The building will be used for additional manufacturing purposes.

TACOMA, WASH.—The contract for drilling test holes on the Lake Cushman dam site for the city of Tacoma has been awarded to Lynch Bros. of Seattle, on their bid of \$5.85 a foot, bringing the total for 2500 ft. to \$14,625. The drilling will ascertain the unquestioned soundness of the Rock walls and bottom of the canyon of the Skokomish river.

TACOMA, WASH.—The Northern Pacific Railway Company has contracted with the Griffin Wheel Company of Tacoma for 2,500 car wheels each month during the present year, this contract representing an expenditure of \$37,500 a month. The Griffin Wheel Company maintains the only plant of its kind west of St. Paul.

PUYALLUP, WASH.—A municipally owned light and power plant in Puyallup, according to authorities, will be a reality in the next year. Several power sites are being considered by the council, with McMillan Falls, six miles southeast of the city, leading in favor. W. T. Dumbolton, consulting engineer of Tacoma, estimates the cost of the proposed plant at \$50,000.

EVERETT, WASH.—Supt. A. M. Chitty, of the power department of the Puget Sound

International Light & Power Co., reports that surveys have been completed, and materials are now being assembled for line extensions east and north of Everett, to cost between \$80,000 and \$90,000. The plan is to furnish electric service to smaller communities and ranchers in the district adjacent to Everett.

TACOMA, WASH.—Unofficially, it is reported between \$300,000 and \$500,000 of the \$12,000,000 to be expended by the Northern Pacific Railway Company during 1922 in additions and betterments, and for new equipment for its lines, will be spent in Tacoma, in the South Tacoma shops. It is also understood that one-third of the freight cars to be built by the company to serve this district, will be built in Tacoma.

THE PACIFIC SOUTHWEST

COVINA, CAL.—Work has started on the new building for the Home Telephone Co. on College Street.

LONG BEACH, CAL.—The Protex Oil Co. will erect an oil factory at Long Beach if a suitable site can be found.

CLOVIS, N. M.—Improvements totaling \$100,000 will be made by the Railways Ice Co. on its plant south of the Santa Fe tracks.

REDONDO, CAL.—H. R. Retichier is planning the erection of an ice and refrigeration plant at Anita Street and Camino Real, to cost \$70,000.

LANCASTER, CAL.—The fruit growers of the south end of Antelope Valley are considering the erection of a pre-cooling plant here to cost \$215,000.

RIVERSIDE, CAL.—The Southern Sierras Power Co. is planning the erection of a power plant in Upper Mill Creek Canyon, just above Forest Home.

ARTESIA, CAL.—The Union Oil Co. will erect a machine shop upon 10 acres of land recently purchased near where it is now drilling at Santa Fe Springs.

LOS ANGELES, CAL.—Frank E. Garbutt has announced that plans are completed for the erection of a large film laboratory for the Famous Players-Lasky Corporation.

SAN PEDRO, CAL.—The contract for the 400-ft. steel transit shed has been awarded to the Llewellyn Iron Works for a sum approximating \$45,000, and the work is to commence at once.

LONG BEACH, CAL.—J. H. Meldrim, president of the City Transfer Company, is authority for the statement that the company will erect at once a 6-story reinforced concrete storage building.

LONG BEACH, CAL.—Hancock Bros. have arranged to increase their plant by the addition of a \$20,000 enameling and electroplating shop adjoining the present location at 620 E. Anaheim Road.

FULLERTON, CAL.—The city trustees are contemplating the use of \$130,000 of the city funds now available for the erection of the much needed city hall. Announcement is expected in a few days.

GLENDALE, CAL.—Henry Jensen, of 1728 Westmoreland Boulevard, Los Angeles, has received a permit to erect a \$40,000, 2-story store and apartment building at 133 West Brand Boulevard for himself.

PASADENA, CAL.—The city directors have adopted the plans of the city engineer for the ornamental lighting and other improvements to be made on Grand Avenue from Colorado to California Streets. Concrete posts are specified.

LONG BEACH, CAL.—Work will be started at once on the plant of the Kimball Motor Co. at Willowville. The buildings will be one-story, of brick and steel, and will cover an area of 24,000 sq. ft. Company engineers will superintend the construction. The cost is estimated at \$300,000.

BAKERSFIELD, CAL.—The city council will call a special election to submit to the vote of the people the proposed project to issue \$1,500,000 in bonds to purchase, combine, and extend the present water systems now supplying this city.

LOS ANGELES, CAL.—James Sams and Willard Conklin will erect a three-story building to be known as the Casino Theater at Ocean Front, between Marino and Navy Streets, costing \$250,000. Russell & Alspaugh are the architects.

LOS ANGELES, CAL.—Carleton F. Burke will build a 7-story building for lease to the Southern California Music Company at 9th and Broadway. Milwaukee Building Company is preparing the plans for the reinforced concrete structure.

LOS ANGELES, CAL.—A factory will be built on San Fernando Road by the Concrete Lumber Co. for the manufacturers of concrete lumber slabs to be used in building. Henry W. Schlueter, Los Angeles contracting engineer, is the inventor.

LOS ANGELES, CAL.—Architect Leonard Schultze of New York has opened offices in the Pacific Mutual building from which he proposes to direct the work in connection with the \$7,000,000 Biltmore Hotel to be erected at Fifth and Olive Streets.

LOS ANGELES, CAL.—John M. Cooper, architect, has completed plans for the erection of a two-story reinforced concrete factory building on Pico Street, between Stanford and Paloma Streets, for the Angelus Furniture Co., estimated cost \$50,000.

LONG BEACH, CAL.—A corporation to be known as the Long Beach Crystal Ice Co. has recently been formed with a capital stock of \$100,000. A new ice plant will be erected at 2870 American Ave., Willowville, building and equipment to cost \$55,000.

EAST SAN DIEGO, CAL.—City engineer E. Paul has been instructed to prepare the plans for a complete system of water mains and fire hydrants to provide ample service and protection for the city. It is estimated that 70 miles of mains will be required.

CALIXICO, CAL.—Los Angeles capital will erect a steam-driven ice plant of 30 tons capacity in Imperial Valley, according to plans now being prepared by architect Clifford Truesdell and consulting engineers J. W. Purington and H. C. Newton, all of Los Angeles.

PASADENA, CAL.—W. A. Taylor has been awarded a contract for the construction of a stadium here to cost approximately \$300,000. The stadium will be constructed of wood and concrete in the form of a bowl, resembling the new Stanford University stadium.

SANTA BARBARA, CAL.—A modern ice and ice cream manufacturing plant is to be erected on a piece of the Southern Pacific property, according to the announced plans of T. P. Daltzell and H. B. Phillips. \$125,000 will be the approximate cost when completed.

CORONA, CAL.—With a vote of 10 to 1 in favor of a \$150,000 bond issue, this city has shown its approval of the project to purchase a site and erect a modern high school building. Work will begin as soon as the details incident to the sale of the bonds have been disposed of.

LOS ANGELES, CAL.—The design submitted by W. Horace Austin for the Farmers and Merchants Bank was accepted and he was commissioned to direct the plans and construction which will start about June 1st. The building will be 6-story and is estimated to cost \$800,000.

INGLEWOOD, CAL.—W. W. Caldwell, sales manager, and P. C. McBride, of the Everready Heater Co., have announced that a factory will be built on five acres of land near the site of Hicks Dovetail Lath Co. The company is incorporated at \$500,000. John B. Reeves is president.

LOS ANGELES, CAL.—The Ahlswede Mfg. Co. has let a contract for construction of a new plant for the manufacture of suit cases and bags to Ralph E. Homann Co., contractors. The building will be of brick and steel construction and will be located at San Pedro and 22nd Streets.

SAN DIEGO, CAL.—Clifford A. Truesdell, architect of Los Angeles, is preparing plans for a condensed milk plant to be erected in this city. The capacity will be for 50,000 lb. of milk per day. Refrigeration equipment, storage rooms, elevators, etc., are mentioned as included in the plans.

HOLLYWOOD, CAL.—Milwaukee Building Company is preparing plans for the Hollywood Athletic Club's new home at Sunset and Hudson. The building will cover the entire property, 200 ft. by 157 ft., and will conform to Italian Villa type architecture. The cost is estimated at \$100,000 exclusive of furnishings.

THE INTERMOUNTAIN DISTRICT

RAYMER, COLO.—Clare L. Brackett has organized The Raymer Light and Power Co. to supply electricity to this community.

CRAIG, COLO.—The Craig Light and Power Co. has been incorporated by W. W. Grant, Jr., J. S. Macbeth and J. P. Steele, for \$25,000.

GRAND JUNCTION, COLO.—A new \$100,000 moving picture theater will be built here shortly by a company of which Walter Walker is the head.

COLORADO SPRINGS, COLO.—The Automatic Electric Control Co. has been incorporated and headquarters have been opened by Harris and Price in the Burns Building.

DENVER, COLO.—Two new viaducts costing over a half million dollars each will be built, shortly by the city and certain railroads. Special lighting systems will be installed.

SALT LAKE CITY, UTAH.—It is announced that work will begin in the early spring upon the construction of the new joint depot of the Bamberger Electric Railroad and Orem electric line. Approximately \$200,000 is to be spent in this construction.

SALT LAKE CITY, UTAH.—Salt Lake county has obtained federal aid for the building of the proposed highway between Magna and the Tooele boundary, and work on the road will be started about April 1. The road will cost approximately \$211,000, of which Salt Lake county will pay approximately \$54,000.

OGDEN, UTAH.—A proposed system of highway lighting on the paved highway between Ogden and Salt Lake is being considered. This would cover a distance of approximately thirty-six miles. While no definite steps have been taken in regard to the matter, further developments are expected in the near future.

PAROWAN, UTAH.—Parowan City, by its city clerk, has applied to the Utah state engineer for authority to divert 21.03 cubic feet of water from Center creek, in Iron county, for the purpose of developing 340 hp. of electric energy for the furnishing of light and power to the citizens of Parowan. The diverting works will consist of a pipe line of wood and iron, which will carry the water so diverted 6000 ft.

SALT LAKE CITY, UTAH.—The Telluride Power Company has filed application with the Utah state engineer for the use of 100 sec.-ft. of water from the Sevier river, a short distance below the town of Sevier, in Sevier county, to be used in the development of 900 hp. of electric energy, which will be connected up with the company's distribution system in Beaver, Millard, Piute, Sevier and Sanpete counties and elsewhere. The proposed plant is at the intake of the Sevier valley canal.

Journal of Electricity

and Western Industry

25 Cents a Copy

March 15, 1922

San Francisco

...has in
...with whom it deals for
...of life.

Big Creek No. 8 Has Many Impressive Features

The Southern California Edison Co. have added one more plant to their system with the completion of Big Creek No. 8.

Among the important elements of this plant is the installation of 2200 feet of Kellogg lap-welded steel pipe for the penstock. This pipe is all installed at the above ground, mounted on piers and anchored at essential points. Each piece of pipe is equipped with bump joints, while expansion joints are placed in the line between each pair of anchors.

The diameter of the pipe at the upper end is 7 feet and 6 feet at the lower end; it varies in thickness from 7/16" at the upper end to 1 1/4" at the lower end, where it is subjected to a working pressure of 311 pounds.

Muscle Shoals may be, and is, a mine for real name, though now officially the mission line.

KELLOGG

Pacific Coast Representatives
The PELTON WATER WHEEL CO., San Francisco



"The Correct Design"

PINCO

Insulators

Are designed and produced by men who are pioneers in the development of porcelain insulators.

Pin type insulators for all voltages up to 70,000. New improved wet process strain insulators.

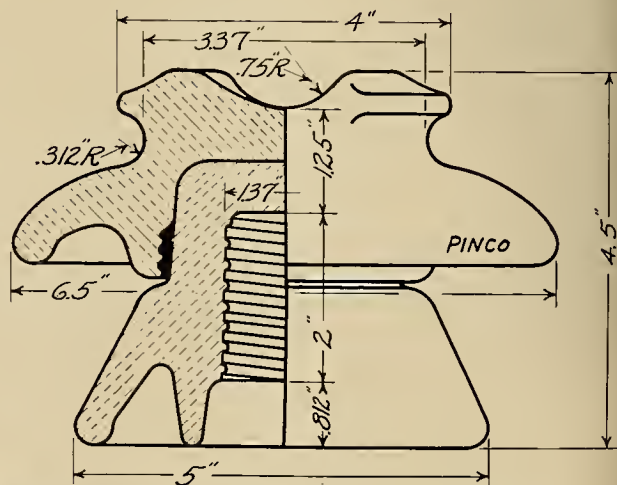
MANUFACTURED BY
PORCELAIN INSULATOR CORPORATION
LIMA, N. Y., U. S. A.

Pacific Coast Distributors

Baker-Joslyn Company

330-332 Azusa St. 183-199 First St. 2424-28 First Ave. South
LOS ANGELES SAN FRANCISCO SEATTLE

Send for Descriptive Bulletin



Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, MARCH 15, 1922

NUMBER 6

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1922, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

Printed in U. S. A.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Engineering News Record
American Machinist

Power

Chemical and Metallurgical Engineering
Coal Age

Engineering and Mining Journal-Press
Ingenieria Internacional

Bus Transportation

Electric Railway Journal

Electrical World

Electrical Merchandising

Journal of Electricity and Western Industry
(Published in San Francisco)

Electrical Review and Industrial Engineer
(Published in Chicago)

American Machinist—European Edition,
(Published in London)

Pacific Mining News Supplement to
Engineering and Mining Journal-Press
(Published in San Francisco)

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

221

The Open Door Policy—Industrial Prosperity Indicated by Power Sales—Re-vamping Legislation to Fit Changed Conditions—Western Forests Threatened by Eastern Pest—Irrigation Projects of West Coast of Mexico—A No Voltage Release for the Pumping Plant—Cooperative Marketing Within the Law—The Value of Tact—Gambling Has No Place in Engineering.

California Should Profit by the Experience of Ontario 229

By ROBERT SIBLEY

The results of government ownership and operation of hydroelectric power in Ontario compared with private ownership and regulation in California.

What the Association Can Accomplish Through Education 234

By LAURENCE W. DAVIS

An appeal by the Special Representative of the National Association of Electrical Contractors and Dealers for an extension of association activities to include small contractor.

Informal Ruling on Lawful Activities of Trade Associations 236

Correspondence between Secretary Hoover and Attorney General Daugherty on the lawful activities of legitimate trade associations.

Electric Heating from the Point of View of the Central Station 238

By A. STRAUCH

Central stations realize the desirability of the heating load and are encouraging it wherever possible.

Western Comment on Current Events 224

Letters to the Editor 226

Radio Bulletins 227

Builders of the West—Henry M. Robinson 228

Kilo Watt Is Starred in Movie Produced for N. E. L. A. 239

Aluminum Cable Steel Reinforced Withstands Storm 240

Self Improvement in Salesmanship 241

Western Dealer, Jobber and Agent 243

Activities of the West 246

Meetings of Interest to Western Men 251

Personals 252

Manufacturer, Dealer and Jobber Activities 254

Business Outlook in Western Market Centers 255

Construction News and New Industrial Developments 256

Salvage 258

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY of CALIFORNIA, Rialto Building, San Francisco

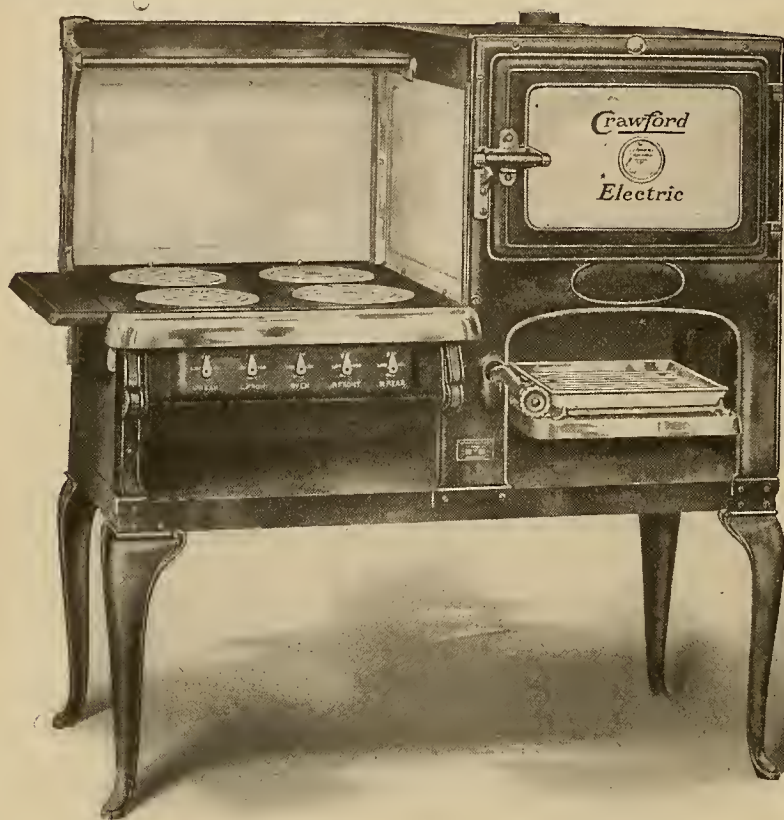
James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.



Model 18-70 R. S. E.

Crawford Electric

Showing the Crawford Adjustable Broiler lowered for use.

Standard Equipment: open coil units; two front units each 1,500 watts; two rear units each 1,000 watts; oven unit 2,000 watts. Heavily insulated oven, 18 in. x 17 in. x 13 in. with white enamel door and removable linings. Oven at right or left side. Canopy and hot closet added if desired.

THERE is no mystery about the new Crawford Electric Range—only studied, scientific simplicity.

It is made by standard stove practice in what the industry calls "the finest stove plant in the world."

It is so built for the dealer that he may turn over a good profit on a low inven-

tory, and a flexible but complete line.

Certain exclusive Crawford features increase its conveniences and simplicity of design.

It bears a name that has carried its makers to the leadership of the range industry, and it is worthy of that name.

Our Pacific Coast represen-

tative, Mr. Burton Y. Gibson, will be glad to arrange to show you the line if you will write him at San Francisco. Trade handbook, with full specifications, deliveries and prices will be sent promptly on request.

WALKER & PRATT
Manufacturing Co.

Crawford Electric Division

Boston

Mass.

Electric Ranges graduated from the experimental stage to practical simplicity with the invention of the

Crawford

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 6

SAN FRANCISCO, MARCH 15, 1922

Per Copy, 25 Cents

The OPEN-DOOR POLICY

THE electrical industry like all industries is at present feeling the pains of readjustment. A study of the tendencies within the industry would also lead one to believe that it was also afflicted with growing pains. At any rate the manufacturing, jobbing and retailing branches of the industry appear to be passing through a period of change which is characterized by a searching criticism of the system of distribution. No ready made solution appears to be at hand for many of these problems which are variously attributed to an era of competition incident to readjustment, and to the inability of the present agencies to expand with the growth of the industry. The ablest minds in the electrical, as well as other industries, are engaged in solving these complex problems, and it is apparent that some fundamental changes will result.

Of great importance in this connection is the present status of the electrical contractor-dealer. The contractor-dealer has been the recipient of advice, education, and "cooperation"; he has been cudgeled and cajoled, instructed and directed. In the past the contractor has been encouraged to become a merchant and attempts have been made to confine the distribution of electrical goods to electrical stores. This idea seems to have generally been disregarded recently, and manufacturers, in particular, are seeking outlets through hardware, furniture, drug and department stores. Whether furniture and hardware stores will gradually enter the contracting field through the opening of service departments is problematical, but is held to be inevitable by many observers.

Coincident with this competition crowding the contractor-dealer in the merchandising field, he has been seriously hampered in the contracting field in many localities by an influx of "wire-men" and "curb-stoners" who have practically monopolized the residence wiring field. Whether this condition is merely the product of the times and of passing interest is also problematical.

But the results are bound to be serious and far reaching. Aside from the effect of crippling the legitimate contractor-dealer by cutting down his volume of business, much of the educational work of the past five years will have been wasted. It is of utmost importance to all branches of the industry that the domestic use of electricity be increased. Yet the itinerant contractor has no interest in this. All he sees is the immediate job, which he often takes at a loss to himself, and incalculable future loss to the customer, the jobber and manufacturer.

The electrical industry cannot afford to overlook these facts, which are nation-wide tendencies, and not confined to the West by any means.

In another part of this issue, Laurence W. Davis, Special Representative of the National Association of Electrical Contractors, makes a plea for wider extension of association activities to include these small men. He presents some powerful arguments which cannot be disregarded.

Mr. Davis believes that the solution of the problem of the "shoestring" contractor does not lie in an effort to eliminate these contractors or to lessen their number by any restriction, other than adequate license laws, safeguarding the requirements of good workmanship and protection for the public.

We hold no brief for the itinerant contractor, who in the past has not been amenable to cooperation as a class. Nor do we hold that the present associations of contractors and dealers are infallible. Nevertheless, the legitimate electrical contractor-dealer appears to have lost his position as the favored outlet for electrical goods, and his educational and cooperative associations no longer represent the industry in many communities in the country.

The alternative to restriction, which seems to have failed, appears to be absorption and education.

Industrial Prosperity

Indicated by Power Sales

FIGURES on industrial sales of power in California as prepared by the Federal Reserve Bank, indicate that in spite of such measure of hard times as the state has suffered, industrial growth has gone steadily forward. Industrial sales during the month of December, 1921, were 11.5 per cent greater than during the same month in 1920. Monthly records for the past six months segregated by industries show the extent of seasonal changes in demand in

agricultural sections, a gradual but steady improvement in sales to the mining industry and a similar trend (except through the period of the oil workers' strike in the San Joaquin Valley oil fields) in sales to the oil producing industry.

It is a significant tribute to the essential relationship which the electrical industry bears to all industrial development upon this coast that these figures can be taken as an accurate index of industrial prosperity. As one of the leading industries in the West, development of the power industry

itself is encouraging. During the past year's time there has been an increase in plant capacity of 24.7 per cent—a remarkable record which testifies to the readiness of the power companies to serve the needs of the West and their confidence in its steady growth. During the same period industrial consumers increased 8 per cent and the connected industrial load 10 per cent. Comparing these figures with the 11 per cent increase in industrial sales, it is obvious that not only was considerable new load added to power company lines during this period of scheduled depression, but that more power was used per unit installed in December, 1921, than twelve months before—in other words, that the plants were more active.

Re-vamping Legislation to Fit Changed Conditions

PRESENT business readjustment, with its increasing roll of commercial failures and the inevitable tendency toward keen competition and price-cutting which are the result of falling prices, sluggish markets, lack of business knowledge or just plain inefficiency, has caused the usual inquisition into our legislative procedure, the usual utopian suggestions and advocacy of exploded theories. Despite the fact that the present generation of business executives have not been through a period of real depression, it is evident that there has arisen nevertheless, a more general realization of basic and fundamental economic laws which no mere legislative measure can control or to any degree influence.

There are certain laws in force which have not been amended to keep pace with changing business conditions, notably the laws regarding combinations in restraint of trade, which have in the past acted to hamper the legitimate functions of legitimate organizations or trade associations. The correspondence between Secretary Hoover and Attorney General Daugherty, which appears on another page of this issue, shows a sympathetic understanding on the part of the Secretary.

On the general subject of cooperation, with particular regard to the functions of trade associations, the following quotation from The Wire Message, published by the Habirshaw Electric Cable Company, is of interest:

What is needed is a form of cooperation that will give accurate knowledge of supply and demand, and of the general financial and industrial situation. Such knowledge makes possible scientific production and distribution, which today is carried on in a haphazard way by many important industries. The possession of such knowledge is one of the important advantages of large organizations. Less favored industries are endeavoring to accomplish the same result by means of trade associations. It is true that at one time many of these were guilty of arbitrary price fixing, but this belongs to the distant past. What trade associations are endeavoring to do today, is to collect and distribute information, which will assist in producing a more efficient conductance of business. That such information must affect prices is obvious. No one is going to lower prices if he knows supply is short and demand increasing, or raise prices when these conditions are reversed. This does not mean an agreement as to prices, for each one has to consider special conditions which differ more or less from those of his competitors, but the general trend of the prices of each member will be the same and perhaps identical, if each gets the same information and uses it intelligently. The chief handicap to the efficiency of trade asso-

ciations is the difficulty of finding some way to scientifically meet the constantly changing conditions of business, without running foul of an unchangeable law. Attorney Generals have assumed that the collecting and distribution of information that would naturally affect prices, and an opportunity to fix them, was evidence that they had been fixed, or would be unless prompt action was taken to prevent it. This attitude has forced trade associations to become largely social in character. Pleasant social relations with competitors are certainly desirable, but they contribute very little to a wide and accurate knowledge of trade conditions.

Secretary Hoover has shown a sympathetic attitude towards trade associations, and a clear understanding of their purposes and value. He has asked their cooperation in collecting and distributing industrial data. It should be cheerfully and thankfully given. While the decision of the Supreme Court in the Hardwood Manufacturer's case will hamper Secretary Hoover's constructive industrial policy, it is unthinkable that some way cannot be found either to interpret the law in accordance with the rule of reason, or to amend it so that it will not be the serious menace to legitimate business that it is today. The Sherman Act and its twin brother, the Clayton Act, are entirely out of harmony with modern thought, and a serious handicap to progressive industrial development. They are useful only to furnish notoriety and fat fees, for certain members of the legal profession. These facts are forcing small independent concerns into destructive competition with powerful organizations, and encouraging mergers, which are the sole protection against such competitors. They are defeating the very purpose for which they were enacted. The decision in the Hardwood case emphasizes this fact.

Western Forests Threatened by Eastern Pest

THE above title does not refer to the dangerous attitude toward forest conservation which has been expressed by certain Washington officials, who indeed, are western, rather than eastern in their origin, but to the appearance within recent months of the white pine blister rust in western forests. This is one of the most serious pests with which the forestry department has to contend—one which has done untold damage to eastern forests in the destruction of coniferous trees. It is a native of Europe and until recently it was confined in this country to the New England and lake region, but reports indicate that it has now appeared in British Columbia and in the state of Washington.

Seven western pines are subject to attack: sugar, western white, limber, white-bark, fox-tail, bristle cone and Mexican white. The first two are among the half-dozen greatest western timber trees; all of the seven add greatly to the beauty of the western mountains. Forestry and timber interests alike are taking active steps to stamp out this disease in the West. It is to be hoped that it will be possible to check it before it spreads from the present small focal area.

Irrigation Projects on West Coast of Mexico

IRRIGATION developments in Mexico, more particularly along the West Coast, are of far-reaching importance. This is evidenced by the interest which American business is displaying in this development.

Recent Department of Commerce reports prove that export trade from the United States to Mexico has grown 472 per cent since 1913, and that 1921 maintained an increase, though small, in the face of

a falling off for all the Latin-American exports combined of \$800,000,000 below 1920.

No better evidence need be found to establish the value of an understandable trade relationship between our next-door neighbor to the south and ourselves. This is particularly true of the western states and there can be no doubt that General Antil Flores, Governor of Sinaloa, will look to our own Southwest for help, both suggestive and material, when it comes to developing the five large irrigation projects now contemplated.

The first of these is under way and it is said will provide water for 450,000 acres from the Culican River. It is to be completed within six months. Present plans call for the irrigation development of 1,500,000 acres in four river valleys of western Mexico.

A No Voltage Release For the Pumping Plant

THERE is great present day need for the development of a suitable no voltage release for auto starters which will either manage to hold the starter in close position until the voltage is dropped practically to zero, or else the development of the present release by the addition of some small time element. The purpose of this development would be to bring about the elimination of interruptions to agricultural service caused by slight dips in voltage due to switching or troubles on transmission systems. More than one western power company is desirous of seeing the development of such a device. As it is now, a slight dip in voltage will cause the low voltage release to operate and disconnect the motor from the line. If this occurs in the early part of the evening in any typical agricultural district of the West, the farmer probably does not find it until the next morning, and his pump, which is probably pumping into a reservoir, has been idle all that time. With 500,000 horsepower installed in California alone devoted to agricultural pumping, this problem of the development of a proper no voltage release for the pumping plant becomes one of no mean proportions.

Cooperative Marketing Within the Law

WHEN President Harding signed the Capper-Volstead cooperative marketing bill, which legalizes cooperative associations of farms and producers for marketing purposes and exempts them from the Sherman anti-trust law, he removed the stumbling block which for years has prevented a more widespread adoption of this plan of marketing. Next to irrigation water, the western farmer has come to look upon his non-profit association as the one thing between him and constant uncertainty. True he still has lean years, when the season's report is written in red figures, but he knows that if his crop is handled through a sales organization that only takes from two to three per cent of his dollar and that bad debts amount to nothing—if anything under the sun will see him through from year to year, it is a farm marketing association.

The West is deeply grateful for the services rendered by the late G. Harold Powell. He will not soon be forgotten, nor the value of his work fail to be appreciated by those identified with the increased development of marketing organizations which will surely follow the recently enacted legislation.

The Value of Tact

WHAT may result in the loss of good will through a lack of foresight in educating its public has been well illustrated in the past few weeks by the experience of one western power company which has recently lost the business of one entire community through such a misunderstanding. In this case, an increase in rates was announced without first carrying on a publicity campaign to prepare the public for the need for such a change. As a result of this oversight, very general opposition to the new rate and to the company was aroused, with the consequence that the town purchased the distribution system and is about to obtain its power from another power company.

If anything is needed to convince power men of the need for good will advertising, such instances as this should provide convincing argument. On the same theory that it is easier to keep well than to get well, it is much the wiser to keep cordial relations with the public served than to attempt to restore them, once lost.

Gambling Has No Place in Engineering

CONTRACTS are regarded as essential to the conduct of modern business. Business agreement may be made verbally, but they are always confirmed in writing and provisions for payment, in case of abandonment of the project in mid-career, are not omitted. The engineering profession has come to take it for granted that the client's veracity is sufficient safeguard in most business transactions. That this is not always the case, is indicated by recent press reports from one western city, which quotes the city council as voting against the acceptance of an engineering report on the proposed municipal water works system.

There is a lesson in this for the entire engineering profession and especially for that branch which finds occasion to deal with municipalities and their problems. When contracts are taken with contingent clauses, they should also provide for the payment of the engineering expense incurred, even if the entire project is not completed. In this case, the assumption was made that the rendering of the report would be followed by a bond election to secure the sentiment of the people on the proposed development. The bond election was not called by the city fathers—and in the absence of a clause in the contract to the effect that such a bond election would be called, the engineers are forced to accept as final the breaking of a gentlemen's agreement.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Twenty Million Construction Program

Pacific Gas and Electric Company Announces Expenditures During the Past Year in Plant Improvements and Additions

THAT the financial depression has not affected the construction program of western power companies is made clear by the announcement by John A. Britton of the Pacific Gas and Electric Company that his organization had spent \$20,000,000 during the year ending December 31, 1921, in improvements and additions to plant and properties. This is only the beginning of an extensive program of construction on the Pit River and the coming year will see at least an equivalent amount expended. For a similar program, the Southern California Edison Company recently announced a \$22,000,000 allowance for 1922 plans. Mr. Britton says in regard to the 1921 figures:

The total approximates \$20,000,000, with of course, as you know, a large amount of unexpended capital unaccounted for at the end of the year in shape of materials and supplies. The principal items involved are approximately \$2,500,000 in ordinary daily routine expenditures; \$10,000,000 in the developments on the Pit River and Hat Creek, and the balance for gas, electric and water betterments.

Montana Leads in Use of Electricity

Figures Issued by Public Service Commission Show Montana Has Well Lighted Streets and High Percentage of Wired Homes

STATISTICS on the comparative use of electricity in any community may well be taken as an index of the wide awake development of that district. Measured by such standards, the state of Montana must be taken as the most progressive spot in the United States at the present time. It is certainly the best illuminated. The public service commission of Montana is authority for the following figures:

"The average per capita expenditure for street lighting in the United States is 71 cents. The average for the eastern states is 80 cents, while Montana leads all of the states of the Union with a per capita expenditure of \$1.19.

"This state ranks with the highest as a user of electricity for general purposes; we pay more for our energy than other states, not because the rates are higher, but because our citizens use more current. With the rapid development of appliances, Montana housewives were among the first to install labor saving devices designed to take the drudgery from household work, until now there is hardly a utility in the state which does not depend on the revenue from the heating, cooking and general appliance load for an ever increasing proportion of its income.

"A census has recently been taken in other western states to determine the percentage of electricity users; the average was found to be about 75 per cent. Of the 22,000,000 homes in the United States, but 7,000,000 or 31.8 per cent

are wired for electricity. No census has been taken in Montana, but it is interesting to note that many of our cities and towns report a ratio of one consumer to every three persons.

High Rates

"Taking 108 cities and towns of which we have complete records, both as to population and consumers, the total population is 240,166 and the number of consumers 74,517; this is a ratio of 3.4 to 1 and would indicate that many of our cities have a record of 98 to 99 per cent of homes electrified. The consumers in even the smallest towns now demand 24-hour service, and in many the lighting is considered but incidental to the general service. A home is no longer modern unless liberally equipped with 'convenience outlets' for the attachment of appliances."

The commission states that the four principal watersheds of Montana are capable of development of nearly 1,000,000 horsepower of which 290,000 is utilized at the present time. The sites are located almost entirely in the western third of the state. Western Montana, it is said, offers almost unlimited possibilities; the Clark's Fork and Flathead rivers alone, with Flathead lake used for storage, are capable of developing 578,500 horsepower, using the maximum possible storage of Flathead lake.

Facts to Meet the Ontario Argument

Murray-Flood Report on the Accomplishments of the Hydro Electric Commission of Ontario Ready for Distribution

WHENEVER public ownership of public utilities is under discussion, the experience of the Hydro Electric Commission of Ontario, Canada, is brought forth as evidence of the desirability of government control. A few years ago it was the Northwest which was endeavoring to combat this argument, more recently it is California, whose Water and Power Act which comes up for voting in November, is modeled closely after the Canadian experiment.

Power men and those who have studied the question independently have always been skeptical of the reported success of the Ontario system—but in spite of apparent openness on the part of the Commission, essential facts have been difficult to obtain and vague statements of cheap rates and comparative costs have gone unchallenged.

With this issue, the Journal of Electricity and Western Industry presents not only a personal analysis by the editor of the Ontario situation from the California viewpoint, but also the report made for the National Electric Light Association by the engineering firm of Murray and Flood on "Government Owned and Controlled Compared with Privately Owned and Regulated Electric Utilities in Canada and the United States." This is a comprehensive, reliable engineering report on the entire situation and permanently settles the question as to comparative advantages of the two systems. In summariz-

ing the results of the investigation the report asserts that no system of electric service such as that operated by the Hydro Electric Power Commission of Ontario is applicable to the United States, for the reason that it is subversive of American policy and custom and in addition is inefficient, expensive and wasteful.

The publication of this report is one of the important events of the past two weeks—and combined with the local study of the California situation which is being published by the Journal of Electricity and Western Industry, beginning with this issue, should stand as a complete reference book for those interested in safeguarding our present institutions.

Colorado Plans Referred to the Senate

Secretary Recommends Government Built Dam at Boulder Canyon Financed by State Contributions for Power Rights

IT is perhaps necessary to do a certain amount of talking before any project of importance is carried out. With Secretary Fall's recommendation in his report to the Senate that the Boulder Canyon project be constructed by the government at state expense, the conversational period in the matter of the Colorado River is inaugurated. Among the Secretary's recommendations are the following:

It is recommended that through suitable exchange the United States undertake the construction with government funds of a reservoir at or near Boulder Canyon in the Lower Colorado River to be reimbursed from leasing the power privileges incident thereto.

It is recommended that any state interested in this development shall have the right at its election to contribute an equitable part of the cost of the construction of the reservoir and receive for its contribution a proportionate share of power at cost to be determined by the Secretary of the Interior.

It is recommended that the Secretary of the Interior be empowered after full hearing of all concerned to allot the various applicants their due proportion of the power privileges and to allocate the cost and benefits of the high line canal.

It is recommended that every development hereafter authorized to be undertaken on the Colorado River by Federal

Government or otherwise be required in both construction and operation to give priority of right and use (1) to river regulation and flood control, (2) to use of storage water for irrigation, (3) to development of power.

It is now necessary for both the Senate and the House to consider whether or not they are willing for the United States to undertake this obligation. In view of the fact that the Southern California Edison Company has volunteered to carry out this very construction, combined with a desirable reservoir on the upper river under complete government supervision, to comply with all government regulations in the use and distribution of water, it may be that Congress will not feel it necessary to make this expenditure. Those who still have some hope that work may be commenced on the Colorado before the next flood season are urging a prompt decision—preferably turning the matter over to private initiative to carry through.

Manufacturing Figures on Coast Cities

Portland Chamber of Commerce Issues Complete Comparative Statement on Census Report for Seven Western Seaport Cities

RECORDS in 1922 manufacturing development are claimed by almost every city on the Pacific Coast and it is a dull week in which some Chamber of Commerce does not issue a bulletin setting forth the incorrectness of previously published figures (published, that is, by the Chamber of Commerce of some rival community). A relief from this unfortunate program of petty competition is the recent publication from the Portland Chamber of Commerce which lists manufacturing statistics from the seven largest seaport cities of the West. These figures were taken from the 1919 Manufacturing census and are sufficiently complete so that the reader is allowed to draw his own conclusions with some degree of fairness. They show, incidentally, that Portland ranks very high, not only in the number of establishments, but in the total value of output.

FIGURES ON MANUFACTURING IN SEVEN WESTERN CITIES

	San Diego 74,683	Los Angeles 576,673	San Francisco 506,676	Oakland 216,261	Portland 258,288	Tacoma 96,965	Seattle 315,312
All persons Engaged in Manufacturing Enterprises	4579	59,249	61,328	26,736	31,469	12,355	47,074
Total Selling Price of All Manufactured Products at Plant in 1919 Whether Sold or Unsold.....	\$20,226,000	\$279,327,000	\$417,321,000	\$134,756,000	\$196,380,000	\$103,172,000	\$274,431,000
Value Over Raw Material Cost Added by Manufacturing Operations per Person Engaged in 1919 (Total Value of Product per Person)	\$2012 (4417)	\$2018 (4714)	\$2542 (6800)	\$2647 (5040)	\$2732 (6240)	\$2419 (8350)	\$2650 (5829)
Total Capital Invested in All Manufacturing Plants	\$23,175,000	\$158,861,000	\$326,398,000	\$118,882,000	\$106,365,000	\$68,098,000	\$157,915,000
Value of Product in 1919 per Dollar Invested	\$0.87	\$1.75	\$1.28	\$1.14	\$1.85	\$1.50	\$1.73
Total Industrial Salary and Wages Paid in 1919.....	\$4,866,000	\$71,956,000	\$78,621,000	\$36,693,000	\$46,816,000	\$17,602,000	\$76,456,000
Value Over Raw Material Cost per Dollar of Salary and Wage in 1919 (Total Value of Product per Payroll Dollar).....	\$1.89 (4.15)	\$1.66 (3.88)	\$1.98 (5.30)	\$1.92 (3.67)	\$1.84 (4.20)	\$1.69 (5.86)	\$1.67 (3.58)
Number of Manufacturing Establishments	266	2543	2360	593	846	348	1229
Size of Plants. Average Value of Product per Plant in 1919 Employes per Plant.....	\$76,188 17	\$109,840 23	\$176,830 26	\$227,244 45	\$232,127 37	\$296,471 35	\$223,296 38
Average Annual Salary and Wage per Person Employed.....	\$1,063	\$1,215	\$1,282	\$1,373	\$1,484	\$1,424	\$1,624

Letters to the Editor

Interesting Sidelights on the Activities of Public Utilities in Spain

To the Editor:

Sir: I am enclosing, herewith, copy of a letter from F. M. Gillespie, who is an electrical engineer with one of the big power companies in Spain. You will note that the continental power companies apparently have somewhat the same difficulties to cope with that we have.

"During the last three years the operating department has drilled into its men the absolute necessity of politeness in all dealings with the public, and the necessity of giving the most nearly perfect service possible with the equipment at our disposal. We have had to fight a 'public be damned' attitude on the part of the men; and it has been my observation that all public utilities employes on the continent feel that the people should take what is given them and be thankful for it. Undoubtedly, the attitude of the mass of employes reflects that of their chiefs. There is now a tendency to instill the service and 'give the customer (both actual and prospective) the benefit of the doubt' idea in all departments of the several companies in this district. That is, everyone seems to be waking up to the fact that when separating the public from its money it should be done in a nice way and the customer given a reasonable return for his cash. It is going to be some time yet before relations between utilities and public are perfectly amicable, but there is a tendency to educate the public to see our point of view and to teach our men to appreciate the customer's viewpoint.

"The demand for electric power was so great during the war when coal was not to be obtained that the power companies had to close their contract departments, to all intents and purposes, and it has only been since the conclusion of our Camarasa development that any one of the three companies has had a surplus of power available. The three concerns do a little advertising in a Spanish electrical journal but nothing to brag about in a general way. That is, there has been no campaign to promote industry in general and power company business in particular; this probably is due to the reputation of Cataluna as a hot bed of industrial disturbances and the feeling that advertising would be spending money on which no return would be forthcoming. Lately, however, the Ebro company has started the practice of printing pictures and data as to our installations on the reverse side of power bills. About two hundred lantern slides of the different installations have been prepared. These are for showing in the main office windows during a couple of hours each evening. It is hoped that we can get the public to realize the amount of money that the hydroelectric developments (and especially storage reservoirs) represent, so that they will more willingly part company with the elusive coin of the realm in return for kw-hr.

"When the small (lighting, heating and small power) customer does not pay his bill on presentation, a note is sent requesting that payment be made at our office before a specified date. If this is not attended to, a collector armed with pliers, screw driver and meter sealing tools, visits the customer and uses these implements as an argument for immediate payment. This generally works. The smallest customers are not favored with such a special visit; those whose bills amount to less than a certain amount are simply disconnected after the specified time indicated on the mailed notice. When a larger consumer is slow in paying, he is visited by an agent with the 'gift of gab' whose duty is to impress on the customer the fact that we are not running a philanthropic institution and that it will be better for him to pay up and keep his motors running than to have his works shut down. The old methods were more on the strong arm order, but times are changing here as everywhere else."

EMMET N. BRITTON,

Assistant to the General Manager.

San Joaquin Light & Power Corp.

Westinghouse Company to Insure "More Business, Better Business" for 1922

To the Editor:

Sir: Referring to your interest in prospects for 1922, our company, naturally, is strongly in favor of the National Electric Light Association's slogan for 1922—"More Business, Better Business." We are prepared to do our full part in giving practical aid within our province, to all factors of the electrical industry.

We propose this year to conduct a very much greater publicity campaign in newspapers, trade papers and popular magazines than in any previous year. In our public announcements we shall continue to build goodwill for the Electrical Railways, the Public Service Companies and the Electrical Jobbers and Contractor-Dealers. We will supply Dealer helps and attractive window displays. We will continue elaborate apparatus development and research programs. Our men in the field are instructed to work with national and local associations in building up a strong public interest in things electrical. They will also work closely with the commercial departments of the Service Companies, the Jobbers and the Contractor-Dealers.

We believe that with the Public Service Electric Light, Power and Railway Companies advertising broadly their efficient service to the public, with the Electrical Jobbers and the Contractor-Dealers giving prompt and satisfactory service to their customers, with the electrical press continuing its efforts to build goodwill for the industry, and the manufacturers doing their full part, and all of these interests pulling together, we shall indeed see in 1922 "More Business and Better Business" not only in our industry but throughout our country.

E. M. HERR, President.

Westinghouse Electric & Manufacturing Co.

Hydraulic Engineer Sizes Up the Business Situation in the Orient

To the Editor:

Sir: The business year of 1922 in California, no doubt, will be one of activity in fundamentals—as it might well be in the other states, and, judging from a personal survey just completed, certainly will be in Japan and Formosa.

The interest rate on capital is nearing normal, common labor can be obtained at reasonable prices, but skilled labor has not yet taken the cuts necessary to bring great activity in the finely finished products.

The fundamentals such as hydroelectric developments, irrigation projects, cement plants, highway construction, etc., requiring large capital expenditures, and considerable common labor and long time to construct, will undoubtedly engross the attention of the discriminating business men during 1922.

Power developments offer an attractive field of endeavor during this favorable period for their construction.

The horsepower developed per workman in the United States, Great Britain, and Japan is roughly as the ratios, 1 for U. S., $\frac{1}{2}$ for Great Britain and $\frac{1}{4}$ for Japan, and the rate of wages paid the workman in each country is approximately in the same ratios respectively.

The production of manufactured goods is in proportion to the power applied and it follows by the inevitable law of competition that those workmen who direct the greatest amount of power per man will receive the greatest wage.

Japan, undoubtedly appreciating the truth of the above, so well exemplified in the United States, is now developing her water powers with feverish activity and a recent exam-

ination of many of the projects under construction and discussion with the engineers of the many projects in view for the immediate beginning of work give assurance that 1922 will see tremendous activity in this field in Japan.

The government of Formosa, ruled by the governor general appointed by the Mikado, is back of the 100,000-kw. development now in course of construction near Lake Jitsugetsutan, in the center of the island of Formosa.

And so Japan is constructing fundamentals today which will be the field from which prosperity will grow as surely as effect follows cause.

W. M. WHITE,
Allis-Chalmers Mfg. Co. Chief Hydraulic Engineer.

The Accomplishments of Cooperation and the Value of Group Consciousness

To the Editor:

Sir: In the present day of vast organization the term cooperation is often used in a very general and vague sense. It is true that the most general accomplishments resulting from cooperation have a value infinitely greater than suspected. Probably no greater social force exists today than the scores of fraternal, trade and social groups. Individuals, through such constant contact, are continually molding larger vision, greater unselfishness, more patience and broader humanity. One of the most important results of cooperation is group consciousness. By such an expression little more is meant than the appreciation of a group necessity, purpose and ideal. It is not likely that enthusiasm for a particular business activity would be long maintained without the reinforcement of group contacts. Today the entire business world of production and distribution is alive with organized life. It should be fully appreciated that the motive for cooperation is quite different today than fifty years ago. Modern industrial life has developed a necessity for group consciousness. This is often forgotten by the employer when important industrial relations are involved. The laboring man, above all others, must have some kind of association as a vehicle for his expression and enthusiasm. The kind of association is unimportant; the fact remains that inspiration and cooperation are not developed in men without the group sense. Machinery has made an ever increasing number of occupations and an ever increasing number of technical processes. Such a specialized activity becomes deadening through its very requirement of repetition. Such a division of labor has made possible the shorter working day and a vast number of opportunities which otherwise would have been unfulfilled. At the same time the employee, whether in an office, store or factory, becomes a mental vagabond when separated from the organized activity of his line. It is group consciousness that has made the professions of law, ministry, education and engineering. It is group consciousness that will make the profession of business.

STEPHEN I. MILLER, JR.,
Manager Secretary.

Northwest Electrical Service League.

Industrial Data Contains Only Partial List of Installed Capacity in Arizona

To the Editor:

Sir: Your February 1st number of the Journal of Electricity and Western Industry gives a "Comprehensive Listing of Industrial Plants in the Western States Using 100 Horse Power or Over" in which I would judge that Arizona is not given credit for much over ten per cent of its installed horsepower. The mining load in Arizona amounts to about 80,000 hp., whereas you list the mining load as 11,930 hp.

A. G. MCGREGOR, Engineer.

Warren, Arizona.

Radio Bulletins

The Journal of Electricity and Western Industry is sending out each week by radio-telephone a report on the outstanding engineering and industrial developments in the eleven western states, together with a concise review of business conditions in the principal cities in this district. The following excerpts are representative items taken from messages sent out.

Progress on San Francisco's Hetch-Hetchy project which will give the city an unlimited supply of fresh water from the high Sierra has reached the stage where bids are shortly to be called for on the Moccasin Creek hydroelectric plant, which, when completed will generate 25,000 horsepower.

The state of Washington has announced a road building program for the coming year which will require the expenditure of more than six million dollars. Construction for the most part will be conned to the eight great arterial highways in the state.

Ralph Budd, president of the Great Northern Railway, recently announced in Seattle that that road would spend a million and a half dollars for the erection of a terminal at Wenatchee, Washington, which will cover fifty acres of ground and be one of the most complete in the West.

Three and a half million dollars will be spent on the improvement of harbors on the Pacific Coast if the report of the Rivers and Harbors Committee of the House of Representatives is accepted by Congress. Coos Bay and the Columbia River, below Portland, will each receive a million dollars. Eight hundred thousand dollars will be spent in improving both the Oakland and Golden Gate sides of San Francisco Bay and seven hundred thousand dollars will be spent on Los Angeles harbor.

The eleven million dollars which the Southern California Edison Company received from the city of Los Angeles for the company's distribution line within the city limits, will be used for financing further hydroelectric developments, according to a statement made by John B. Miller, president of the company. The company, while relinquishing its rights in Los Angeles, will continue to sell power to the city at wholesale rates.

Valdez, Alaska, has two completely electrified buildings, which have recently been completed. One is the new Seattle Hotel and the other is the Valdez Hospital. The Prince William Sound Water-Power Company is contemplating the enlargement of its plant to care for the increased heating load.

The greatest per capita use of electricity in the United States is claimed for Bend, Oregon, by the Bend Water, Light and Power Company.

Building construction is the chief item of importance in every one of the larger western cities. From all sides come reports that permits are far in excess of the same month for the preceding year, in some cases the increase being as great as 300 per cent. With the coming of spring in the Inter-mountain district and in the Pacific Northwest, building activities have shown a sharp rise. In Denver and Salt Lake homes are being erected to meet the housing shortage. In Los Angeles construction is centered on homes and apartment houses, with a few stores and industrial establishments. Activity in San Francisco is largely confined to the business district with three large class A structures going up. In Seattle the Pacific Telephone and Telegraph Company Building has just been completed.

The building activities have done much to eliminate the unemployment menace. However the problem is still grave in Denver and Salt Lake, where charitable organizations have been forced to care for many cases, while in San Francisco there has been a shortage of skilled building mechanics.

Reports from Portland and Seattle indicate that the lumber situation continues to improve. Figures show that shipments to the Atlantic Coast via the Panama canal increased 325 per cent during the last months of 1921. Wool and wheat prices have both increased and have caused business generally to improve.

Builders of the West

DURING the period of reconstruction, Southern California has been looked upon as the commercial "white spot" of the United States. This position has been maintained chiefly because of the healthy banking situation within that district, and this healthiness in turn has been in no small measure due to the foresight of Henry M. Robinson, president of the First National Bank of Los Angeles and the Los Angeles Trust and Savings Bank, who came to these institutions direct from contacts in Washington which gave him an international perspective and sound experience which has governed his actions as the head of these banks, during the most trying months of the reconstruction period. Mr. Robinson also brought to these banks a record of service—first, on the United States Council of National Defense, then as special commissioner at the Peace Conference, at Versailles, commissioner of the United States Shipping Board, member of the First International Labor Conference at Spa, member of the Supreme Economic Council at Paris and chairman of the United States Bituminous Coal Commission in the settlement of the coal strike. Not only was Mr. Robinson a factor in the maintenance of the white spot, as far as Southern California is concerned, but also within the past two years he has found time to serve President Harding, the republican, as faithfully in the problems of national reconstruction as he served President Wilson, the democrat, in the prosecution of the war. Mr. Robinson's last national service was as a member of President Harding's unemployment conference. Nor is this all, for it is largely due to his presentation of the methods of cooperative marketing developed in California that American bankers are coming more and more to understand the methods by which they can aid the soil producer in the marketing of his products on a broad basis, while the producer himself has come more nearly to realize some of the fundamental principles of finance under which he himself must operate if his marketing problems are to be solved.

A lawyer, a student, a financier, Mr. Robinson brought to his work in California the results of



HENRY M. ROBINSON

President of the First National Bank of Los Angeles and the Los Angeles Trust and Savings Bank, who has been a leader in the financial and industrial growth of the Pacific Southwest.

a wide and varied business experience—an experience which has made him particularly able to cope with the peculiar banking difficulties of the past few years. Beginning his career in Youngstown, Ohio, as an attorney, after leaving Cornell, he was a factor in the industrial and banking development in that city, and carried the Youngstown plants into the steel combinations that took place some twenty years ago. This work finally took him to New York. In 1905, however, he retired from the financial district of New York, one of the youngest and most successful men who had ever entered and voluntarily left that field. Until the outbreak of the war he lived quietly, but, as the man behind the scene, participated in a number of the largest mergers carried on in the West. The work made him a factor in the development of the South-

ern California Edison Company in its merger with the Pacific Light & Power Corporation and in the creation of the Southern California Telephone Company. A trustee of the California Institute of Technology, much of his time has been given to aiding in the building up of that institution. Mr. Robinson looks upon out-door walking as a necessary mental and physical diversion. Not infrequently has he "walked out" the solution of weighty national and international problems. He is fully convinced that Los Angeles is the hub of an economic zone covering the states of the Pacific Southwest, his influence has been felt in the development of Pacific shipping, in the development of water power, in the marketing of cotton, and, above all, in the development of the cooperative marketing associations throughout California. He believes thoroughly in the theory of private initiative, developed along cooperative lines, rather than development of resources through political subdivisions.

To Henry M. Robinson, then, for his exceptional qualities which have been reflected in the successful unfoldment of so many national problems and for his masterful knowledge of the financial problems which must go hand in hand with western development, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

California Should Profit by the Experience of Ontario

Results of Twenty Years of Government Development of Water Power in the Province of Ontario Compared with the Same Period of Growth Under Private Initiative in California

By ROBERT SIBLEY

Editor, Journal of Electricity and Western Industry

TO those engaged in the electrical industry in California, and to those who have watched the unfolding of the gigantic hydroelectric program unsurpassed in ingenuity and daring which has been undertaken by the present power companies, the proposed Water and Power Act, which will be placed on the ballot of that state next November, is a challenge not to be disregarded. To those who are familiar with the history of the triumph over geographical and climatic difficulties which has placed California in the forefront as a manufacturing state and has made possible the development of a diversified agriculture which has been a bulwark against national depression, this proposal to shackle the state with an uneconomic and visionary scheme seems unbelievable. The proposal of this scheme warrants a full discussion of the facts, and I believe that when the facts are known to the people of the state, it will be found that the faith and the confidence of the pioneers of electrical development will not have been misplaced.

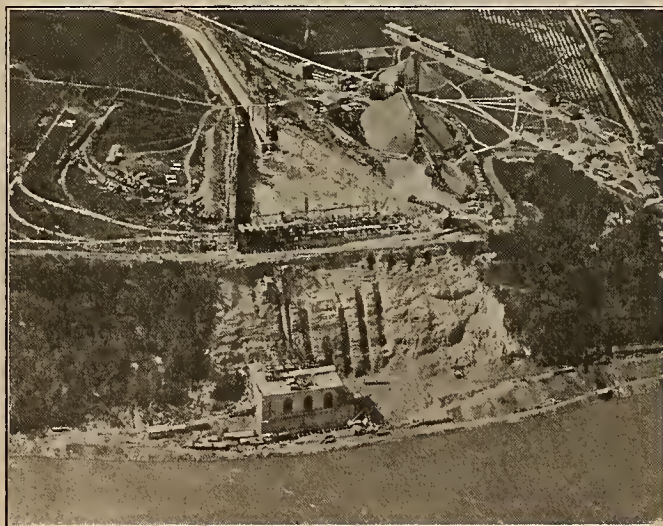
The Journal of Electricity and Western Industry is dedicated to telling the story of the fundamental role of electricity in western growth. My belief in the future industrial and agricultural prosperity of California and the West through the economic development of its hydroelectric resources by private initiative is nothing short of a religion! It was this conviction coupled with a desire to get the facts at first hand that led me to visit the Province of Ontario, Canada, for the purpose of investigating the claims made in a paper read by a personal representative of Sir Adam Beck, the recognized genius of the Hydro Electric Power Commission of Ontario, Canada, at a meeting of the League of the Southwest, held in Riverside, California, last December. These claims as to the success of this particular method of power development which have been tried out in Ontario, form a large part of the arguments of the advocates of the proposed Water and Power Act in California. I do not doubt the sincerity of the proponents of this measure, but from a personal and intimate investigation of the Ontario development, I cannot but believe that they must have been misinformed regarding many of the claims, or ignorant of the actual facts.

Why the Commission was Formed

Before discussing the physical aspects of the development of hydroelectric power from Niagara and its distribution in the Province of Ontario it is of primary importance to consider the condition

which led to the formation of the Hydro Electric Power Commission in that Province. Previous to this time, some twenty years ago, the distribution of electrical energy was carried on with such inefficiency, such high rates, poor service and general disregard for the rights of the consumers that in response to a popular demand for relief from this high-handed procedure, after many gatherings of various public bodies had been held, the Provincial Government was asked by the municipalities interested, for authority to undertake the development, transmission and distribution of electrical power. Contrast this picture with the present hydroelectric situation in California, where the power companies, regulated by the State Railroad Commission, have developed such efficiency and good service, and have so won the confidence of their consumers that their securities are widely distributed among them; and where reasonable rates have re-

THIS article is the first of a series of three based upon a personal investigation by Mr. Sibley of the operations of government development of hydroelectric power in the Province of Ontario. The following articles will deal with a comparison of rates, the extent of agricultural service, and a statistical comparison of the growth of California contrasted with Ontario.



A construction view of the Queenston power house, looking from the American side of the river. One of the penstock units of 55,000 hp. has been installed. The plans call for an ultimate capacity for the plant of between 500,000 and 600,000 hp.

sulted in a wider and more general use of electricity than in any other locality in the world. In fact, the conditions which gave rise to the Ontario Commission have never existed at any time in the history of California!

An Opportunity Overlooked

Instead of meeting the unpleasant situation of twenty years ago by the inauguration of government ownership and its attendant evils, the leaders of thought in Ontario, Canada, might have taken the

other course,—the stimulation of private initiative in agriculture and industry as has been done in California by placing these great projects under rigid public regulation with reasonable rewards held out for further development. Had this been done, the present day developments in Ontario, Canada—industrially, commercially and agriculturally—should have far exceeded their present proportions, for Ontario is blessed with fertile soil, with the world's greatest source of possibilities for cheap water power development and ease in power transmission. Also,



Niagara Falls, the greatest single source of water power on the American Continent, easily accessible for development and surrounded by comparatively level country. The normal minimum flow is 160,000 second-feet, but under adverse windstorms this may be reduced to 106,000 second-feet. Compare this constant source of energy with the conditions faced in developing hydroelectric energy in the West.

it is important to note that the neighboring province of Quebec, where cheap water power is not nearly so available, has completely outdistanced Ontario in all fields of economic development. Or, again in comparison with the development that has taken place on the American side, even though steam auxiliaries have been constructed there at great expense to assist hydroelectric service in the New York territory, Ontario might under properly directed and regulated private initiative have accomplished far more than it has.

Some Results in Ontario

This type of thinking in Ontario which is the result of government ownership has resulted in the belief that all related industries, such as electrical manufacturing and the preparation of semi-raw materials necessary in construction, should be owned

and conducted as government and municipal enterprises. This would directly discourage private initiative or inventive genius in the whole electrical industry which in but a single generation has undergone such gigantic changes that apparently only a mere beginning in accomplishment has been effected to date. California, on the other hand, has by encouragement of individual initiative and private enterprise, harnessed its water powers and spanned its deserts and mountain gorges with energy-bearing power lines, developing that state industrially and



Airplane view of the intake of the Welland River and Chippawa Canal. Note the comparatively level character of the country which is characteristic of the Province of Ontario. Compare this with the hazards of gorge, mountain and desert of our western states.

agriculturally in spite of these difficulties to a degree that dazzles the imagination.

Let us then trace the progress of the Ontario thinking and follow its development. In 1903 the Provincial Government passed legislation authorizing the municipalities to borrow money and to undertake, individually and jointly, to generate, transmit and deliver power, and also to appoint a commission of three to five men to operate and control the system. As a consequence of this early activity the year 1906 witnessed the Legislature of Ontario passing what is known as "The Power Commission Act."

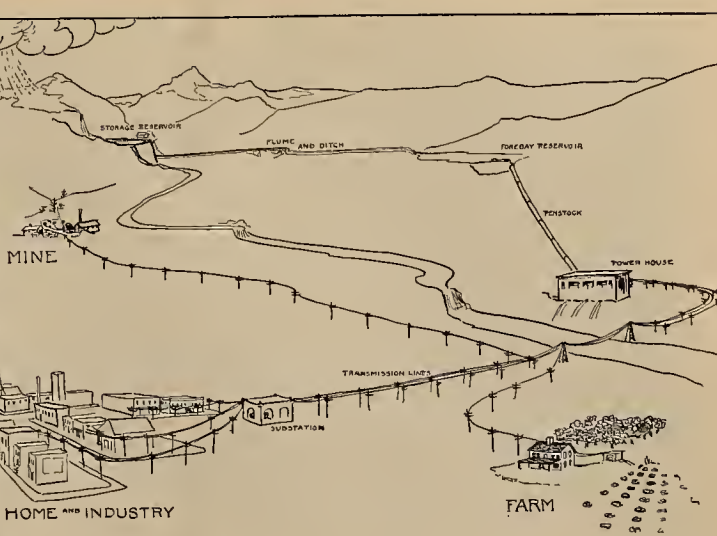
Under this legislation a Hydro Electric Power Commission was created consisting of three members, of which Sir Adam Beck is the chairman. This commission has power to acquire by purchase or develop under its own initiative the hydroelectric enterprises of the Province of Ontario, and in addition to undertake such manufacturing enterprises as it may deem proper in the progress of its work. The commission also has power to acquire by purchase, or otherwise, and hold shares in any incorporated company carrying on the business of operating, supplying and distributing electrical energy.

Act Gives a Practical Monopoly

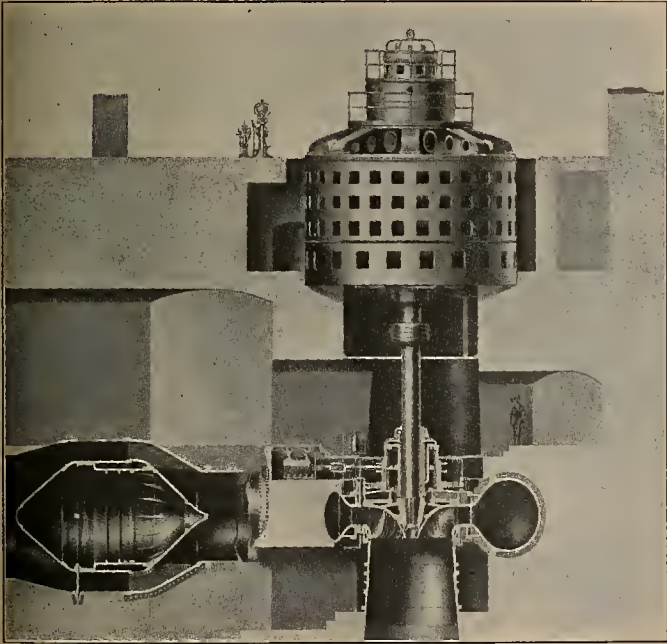
This act has been amended and broadened from year to year so that today its authority is practically absolute in the Province of Ontario. There is one important difference, however, in the Ontario plan and the proposed California Water and Power Act.

It is possible in Ontario for the Premier and Provincial Legislature to over-ride the Hyro Commission, although at present the Commission is so strongly entrenched in Ontario, it is recognized that it would be an extremely difficult task to bring this about. In California, on the other hand, the enactment proposes a constitutional amendment that so establishes a Board of five men in control that only under the recall provision of a two-thirds vote of the Legislature of the state can their hand be stayed.

Let us now examine in detail, how power development for a municipality is accomplished in Ontario. In order to develop power in the Province of Ontario under authority of this Hydro Electric Power Commission of Ontario, a municipality wishing to join the partnership must by vote of its city council first appeal to the Hydro Commission for data covering costs involved and later submit these findings to a vote of the people for final disposal. This final vote is taken in order to enter properly into a binding contract to insure the municipality's



This chart illustrates the difference in cost involved in developing hydro-electric power in California. Compare this with the map of the Ontario development. Heavy investment in giant storage reservoirs, miles of tunnels and ditches and often hundreds of miles of transmission lines, is required in California.



A cross section of the 55,000-hp. units being installed at the Queenston-Chippawa development of the Hydro Electric Power Commission of Ontario. They are the largest units thus far manufactured for hydroelectric development.

share of the obligation involved. All municipalities sign the same form of contract and agree to assume the same obligations, the amount of these obligations depending on the service rendered; that is, a municipality located 200 miles from the source of supply must pay a higher rate per horsepower and assume a larger financial obligation than a municipality located only 20 miles from the generating plant and using the same amount of power. While the Hydro Electric Power Commission has supreme charge of the extended development in its care, each municipality must elect its own local commission to handle the business of its own local system; all rates for service being fixed by the Provincial Commission.

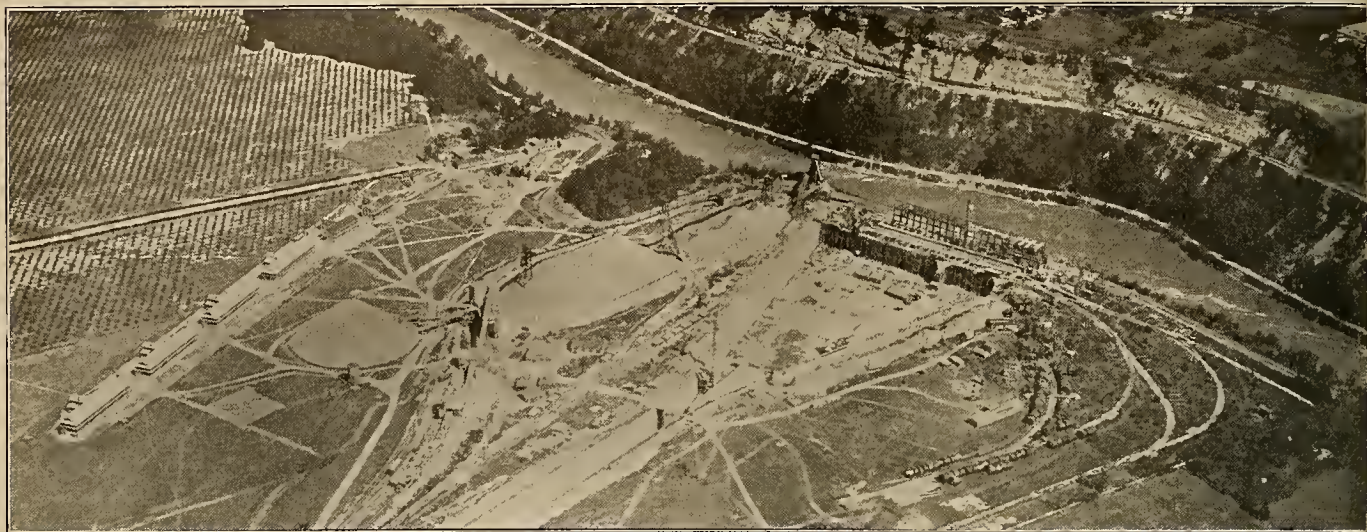
Although the progress of growth of the Hydro Electric Power Commission activities are described by its proponents as being phenomenal, those of us

familiar with the vast decade of hydroelectric construction that has just been completed in California see little in those accomplishments to fire the imagination. The facts are that, while from 1910 to 1920 the Hydro Electric Power Commission of Ontario actually constructed and put into operation something under sixty thousand new developed horsepower with a total announced building program of only 500,000 additional horsepower, those having in charge the inter-connected system of California have built and put into service over 800,000 new developed horsepower and have let major contracts involving an additional million and three-quarters horsepower for the next ten years' period.

The major portion of the Hydro Electric Power Commission's activities in the Province of Ontario seem, on the other hand, to have been devoted to taking over systems already built, and the statement of its growth including these activities is as follows:

Year	Number of Urban Municipalities	1920 Number of Townships	Total Number of Consumers	Total Load in October Delivered in Hp.
1910	10			750
1911	26			15,214
1912	36		34,967	31,019
1913	51	7	65,689	45,502
1914	82	12	96,844	76,977
1915	112	18	120,828	103,959
1916	166	25	148,732	167,661
1917	179	34	170,916	333,399
1918	193	41	183,987	316,592
1919	208	42	216,066	328,175
1920	217	43	244,388	355,798
1921	232	44	.....	.....

Although Ontario is approximately twice the area of California these two states are comparable in that at the time of the formation of the Hydro Electric Power Commission Ontario equaled California in population, agriculture and industry. When we consider that Ontario had available the largest single source of easily developed power at her very door, and that the development of energy in California is attended with the greatest engineering difficulties, the growth of California is nothing short of phenomenal.



A view of the forebay above the Queenston power house, looking toward the American side of the river. Note the ripple stabilizer, consisting of a vertical tongue of concrete, situated in the center of the canal where it broadens into the triangular shaped forebay.

The Great Chippawa Development

We come now to a brief presentation of the one great contribution that the Hydro Commission is making to engineering,—the Chippawa Development at Niagara Falls. But although bold in conception as an engineering enterprise, its financial return in cheap power is challenged by many noted experts, and the present administration of the Province of Ontario views with some concern the costs to which the project has mounted as they vastly exceed the original figures involved.

To those familiar with present power development at Niagara Falls it will be recalled that all of the water power development has thus far made use of simply the main falls of the river of some two hundred feet without utilizing the rapids that exist

for several miles down stream. By tapping the waters of Niagara River above the falls and by the utilization of the Welland River, and a power canal eight miles in length, it is made possible to conduct 18,000 sec.-ft. of water to a point below the rapids at Queenston, thus enabling the utilization of an additional one hundred feet of fall over that available at Niagara Falls.

From an engineering viewpoint this project is interesting. Not only does the gigantic canal show in its construction unusual skill, but the water turbines of 55,000 hp. capacity installed in this plant usher in new records in accomplishment in water wheel design. This plant when completed is designed to generate between 500,000 to 600,000 hp. Two units of 55,000 hp. are now in preliminary stages of operation.

The Financial Difficulties

Coming to the financial aspects of the situation, however, it will be instructive to see how the governmental officials in Ontario other than the Hydro Commission are viewing the costs which have increased enormously over original estimated investments involved in this Chippawa development.

Quoting as an extract from an address made November 10, 1921, by Premier Drury, of Ontario, before the Canadian Club on the Hydro Radial situation in Ontario, the Toronto Daily Star has the following to say:

"The speaker directed attention to the Chippawa development, and pointed out that in 1915 the scheme launched to develop 100,000 horsepower was to cost \$10,500,000; in 1918 to develop the first five units and make provision for 275,000 horsepower the cost was to be over \$25,000,000; in 1919 the scheme, fully grown to develop 500,000 horsepower, was to cost \$40,000,000. Last spring they were assured finally that to develop five units and to make water preparations for developing the rest of the units that the total cost would be \$54,000,000 or \$55,000,000. 'I am betraying no secret,' remarked Mr. Drury, 'when I say since then a very serious situation has developed, that the government having made all preparations to finance, having arranged to finance the scheme at \$55,000,000, received a most unpleasant surprise when it was told some few weeks ago that it would have to provide for the completion of the project another \$10,000,000. That is very serious, and in the view of our experience perhaps we could be pardoned for lacking undue optimism.'"



A sketch of the Chippawa-Queenston development, showing how water is diverted around Niagara Falls and carried to a point eight miles below the intake of the Welland River, thus utilizing an additional 100 ft. of fall above that which is secured at Niagara Falls. It takes 18,000 second-feet of water to fill the canal.



A general view of the vertical section of the Chippawa Canal, showing the level agricultural character of the land through which the canal passes. In the distance is the fill where the canal was changed from vertical to trapezoidal shape in order to cross the gorge at the whirlpool of the rapids.

This speech of Premier Drury took place on November 10, 1921, and indicates that the government was already thoroughly alarmed. During the early part of December the newspapers began to print stories of an additional \$10,000,000 being required, and in a personal interview with Sir Adam Beck in Toronto a week later the writer was informed by Sir Adam Beck himself that the project would cost \$80,000,000. On top of this the Hydro Commission, in order to fill the canal to its 18000

sec.-ft. of carrying capacity, must under international treaty borrow water from some one of the hydro plants already in existence on the Canadian side. To meet this emergency, the commission proposes to take over the Toronto Power Company's plant at a cost of \$30,000,000 which must eventually be scrapped in order to supply the water to fill the Chippawa Canal. In its leading editorial comment of December 31st, *Electrical World*, the leading electrica lauthority in America, had the following to say, under the caption "Ontario Overshoots the Mark":

"This week water was let into the canal of the largest hydroelectric development in Canada, the Chippawa-Queenston station of the Hydro Electric Power Commission of Ontario. Wonderful in conception, bold in engineering execution and mammoth in the size of its units, the installation stands as a monument to the vision and skill of that enthusiastic Canadian, Sir Adam Beck. But because of untoward circumstances it also stands a monument to economic folly. The Hydro Electric Commission of Ontario was able to purchase 100,000 hp. from a privately owned utility, the Ontario Power Company, for \$9 a horsepower-year, and on the strength of that built up the immense network extending a thousand miles in all directions, from Niagara Falls to Toronto on the north, and to Windsor, opposite Detroit, on the west. Despite the fact that its turbines at Queenston operate under a head of 100 feet greater than that available at Niagara Falls, and thus generate one-third more energy for the same amount of water, the Hydro Electric Power Commission of Ontario cannot manufacture at Queenston, much less sell, a horsepower-year of electrical energy for twice the amount it paid to the Ontario Power Company when the company was privately owned and operated. Thus has the Hydro Electric Power Commission of Ontario, lured on by ambition, fallen into a pit of its own digging."

The question of the actual accomplishments of government ownership in Ontario in the lowering of rates and the development of industry, as compared with the accomplishments of private enterprise in California will be taken up in the second article of this series, to appear in the *Journal of Electricity and Western Industry* for April 1st.



Map of the transmission lines of the Hydro Electric Power Commission of Ontario. Note that the interconnected systems of the commission cover a territory approximately 450 by 200 miles.

What the Association Can Accomplish Through Education

The Present Members of the Contractor-Dealer Associations Need to Bring in Every Possible Competitor Before They Have Fulfilled Their Greatest Benefit to Themselves or to the Industry

By LAURENCE W. DAVIS

Special Representative of the National Association of
Electrical Contractors and Dealers

THERE has been during the past few years a rapidly increasing number of small electrical contractors entering into the residence wiring business of all cities throughout the country. So great has this number become in many places that it has developed into a real menace to the best interests of the industry.

The menace, however, lies not in their number but in the character of competition under which they are struggling and which has practically driven out of the residence wiring field all of the older established contracting firms whose experience and knowledge of the cost of adequate and high grade work prohibits their attempting to compete with this class of competition.

There has been a disposition upon the part of many of the older established contractors to resent this entrance of the horde of small "wire men" into the contracting field, with an effort to prevent their becoming established factors in the business by refusing them recognition in organized association work and through discouragement of their support from the higher grade and recognized wholesale channels of supply.

This very effort at elimination is resulting actually in a further abuse of the residence wiring business through the driving of these small contractors to seeking their materials where they may find them, encouraging the use of non-standard and lower grade materials and actually developing a constantly increasing number of pirate jobbers who thrive upon this class of trade.

A careful analysis of the whole situation shows that it is only a normal evolution of the rapid expansion of the electrical industry into greater residence service, accentuated by the ease with which a wireman without funds or credit may enter into the contracting field. The solution of the problem does not lie in any effort to eliminate these contractors or to lessen their number by any restrictions, other than adequate license laws, safeguarding the requirements of good workmanship and protection for the public.

The electrical industry needs these men and needs every retail channel of distribution which it can develop. The industry must recognize, however, very promptly that there lies a great danger in the present development of unintelligent competition under which these small contractors are struggling, and the entire industry needs to turn its attention to the improvement of this competition, and not to its elimination.

Large sums of money are being expended by the industry locally and nationally towards the education

of the public to better understanding of the possibilities of electrical service in the homes, to more complete installations of convenience outlets and to the securing of uniform daylight power loads through broad distribution of electrical household appliances. A large proportion of this effort is being wasted by the destructive competition of the small "curbstone" contractor who sells his job solely on a cheap price basis against similar competition he must face.

The present system of selling house wiring on a uniform outlet price is a vicious circle of destruction to all efforts to raise the standard of electrical service. Whatever the price established in any community for such wiring, the small contractor entering the field feels he must get the job at the current price or less, regardless of the proper charge necessary to set up to insure him a profit upon which he may develop, and usually without any knowledge of what his costs actually are. Having secured the job he feels his whole chance of profit must lie in the savings he may effect in the cost of materials he uses, or the amount of service he renders his customer in fulfilling his contract. He is constantly seeking cheaper, and naturally inferior, materials and striving to find ways to lessen the amount of materials and service used to give the minimum number of outlets under his contract.

In spite of the efforts of the industry to educate the public into a better knowledge of quality service in wiring and electrical equipment, this type of competition encourages the public to believe that cheapness is the first thing to seek when wiring the house and to welcome the contractor with the lowest price.

Quality Is First Consideration

We hear statements oftentimes from those long experienced in the business that lower prices popularize and encourage the use of more electrical service, and that anything which tends to increase the cost will lessen the distribution. This is only true so long as quality is maintained and any system which tears down the quality of service is destructive of development of the industry.

The same arguments for cheaper work have been brought in the past against conduit wiring instead of open knob and tube, or the enclosed safety switch instead of the open knife switch. Experience is proving that the permanent, broadest development of our industry can only come through the giving to the public of complete protection and fullest service and that the price is secondary when the public understands what it is getting.

"No transaction is complete unless both the buyer and seller make a profit." Today both the

buyer and seller in the residence wiring field are making no profits,—the buyer, because through his ignorance the article he buys fails to give him the full service his interests demand, and the seller because the price he receives is inadequate to develop him for greater future service.

Long and intimate study of the smaller contractor in hundreds of cities has convinced me that they are a potential power for service to the industry which we cannot afford to discourage. The industry needs them and needs more of them, but if it is to get a satisfactory service out of them it needs to undertake at once a thorough educational system along business lines.

I have found these men in most cases to be competent and experienced wire men; in many cases they are bright, clean-cut, oftentimes college educated, men; but they lack the fundamental knowledge and experience of business training essential to make them successful managers of their own business. They are the material which the industry must use to extend its service through residence wiring; they are already in the field and were it wise to even think of doing it, they cannot be eliminated.

Education Is Real Task

Let us awake then to the real task which is ahead of us,—the education of these men into good business executives. It is not an impossible or even difficult task. The men themselves are willing and eager to find the key to success. Their improvement as credit risks to the jobber, as buyers of better made materials and their influence as the installers of electric service in the home makes this education imperative.

The work needs to be done with the wholehearted support of the entire industry and in such a way as to win the confidence of each of these smaller contractors that the industry needs and wants him, without any reservation. The work can best be done in local groups of these smaller contractors formed into associations of their own, guided by contact with the older organizations but left to be self-governing. Meetings should be held at regular intervals, usually twice a month, with programs covering only the practical working problem of the smaller contractor, in which he himself takes a leading part under the direction of the secretary.

Analysis of the cost of doing business should be repeatedly made and emphasized in every possible way. Residence wiring should be studied by being sub-divided into all its different types, from the service entrance to the house, through all the different kinds of outlets and circuit feeds, with the amount of labor and material required for each character of work analyzed from figures provided by the men themselves.

The study of a single type of wiring such as a baseboard convenience outlet or a three-way wall switch or a ceiling light outlet is sufficient for a single night's discussion. All figures arrived at should represent only the actual prime cost of labor and material. But with each step of this analysis

there should be worked out the method by which each man must determine and properly add his overhead and the profit he desires, no matter how small that may be.

It can readily be seen that it is impossible to win the confidence of competitors if any attempt were made to establish a uniform selling price. The industry needs to discover and develop those men who can give the greatest service at the lowest economic cost which will provide sufficient reward that they may develop and become capable of giving a greater future service in keeping with the growth of the industry. It can never attain this end through the placing of all men or competition on a common level.

The Results of Ignorance

Experience has proven, however, that no man will deliberately conduct his business to failure. Yet many of these small contractors are failing—over 75 per cent of those entering this field fail. The answer lies in their ignorance of fundamental business principles, and never malicious destructive competition. Place the tools for constructive competition in their hands and they will use them, and the present destructive competition will disappear.

Let us imagine an example: A contractor whose overhead is 23% of his gross business and who desires to make 10% profit on his work is blindly told to add 50% to the cost of his work. He bills a customer \$150 for work which cost him \$100 in time and material.

His customer comes in and complains against this addition of 50% "profit" on the time and material cost, and grudgingly admits finally the justice of this man's getting his overhead of 23% before figuring himself a profit. "But," he insists, "why add 27% more to my bill? Ten per cent is all you are entitled to. Make the bill \$133, or possibly \$135, and I will pay it."

What chance is there that any blind system of a common price can hold up in the face of such a customer if the contractor is not thoroughly founded in his knowledge of why a 50% mark-up will only give him 10% profit if his overhead is 23%? Without such education he readily cuts to the \$135, or even lower, supposing that he has a margin of \$10 or \$12 clear profit at that point. As a matter of fact at \$135 for this particular job, he has only 67c. of profit left to himself, and if he were tempted to cut \$1 lower he would actually lost money.

Let us take that man and help him to find the principles upon which his business must be built if he succeeds. Given those principles we will not need to establish any suggested prices; the man with his eyes open will never deliberately ruin his business by working below cost.

Furthermore it would be impossible for any group of men to arrive at a common price for any type of work. We want the lowest economic cost we can secure. The average overhead cost of the contractors today is over 23%; some men may find it impossible under their present method of operating to bring their overhead below 28%; others may have succeeded in getting it down to 18%. The industry

needs those men who can give us the service at the lowest cost. But it cannot afford the great wastefulness through the thousands of men who annually go down to failure in the residence wiring field, because they do not know their costs.

The future success of association work depends upon its ability to reach out its helping hand of education and help these men to succeed. No firm which attempts to do contracting can be more successful than its competitors permit. The members of the present Contractors' Associations need to bring in every possible competitor before they have fulfilled their greatest benefit to themselves or to the industry.

The National Association through constructive series of monographs covering the principles of the conduct of the Electrical Contractor-Dealers' busi-

ness, economics of retail distribution, estimating and labor data costs, tables for arriving at and using overhead percentages in figuring contracting work, etc., is putting into the hands of the electrical contractors the fundamental information needed to develop their business. During the past two years over 400 educational meetings have been held across the country in starting this work in the various localities.

But at the best the National Association can only act as a clearing house for ideas and source of information for the individual members of the local associations. It is dependent upon a broad-minded spirit in every community to make effective this work, and it is hoped that it will receive such support in a nationwide movement which will benefit the present unsatisfactory residence wiring situation.

Informal Ruling on Lawful Activities of Trade Associations

Correspondence Between Department of Commerce and Department of Justice Regarding Extent to Which Legitimate Trade Associations May Engage in Cooperative Activities

SINCE certain trade associations are involved in litigation which questioned the legality of their performances, and, by reason of the litigation, there is much doubt and confusion regarding the legal limits to which trade associations may properly operate, Secretary of Commerce Hoover wrote to Attorney-General Daugherty for an informal opinion on eleven separate forms of trade association activity, asking if such associations may lawfully engage in any or all of them, "provided the organization and the activity engaged in are not for the purpose of hiding or concealing some agreement, contract, etc., to actually restrain trade or otherwise violate the anti-trust laws." The eleven questions and the Attorney-General's reply are as follows:

1. May a trade association provide for its members a standard or uniform system of cost accounting and recommend its use, provided that the costs so arrived at by the uniform method are not furnished by the members to each other or by the members to the association and by the latter to the individual members?

2. May a trade association advocate and provide for uniformity in the use of trade phrases and trade names by its respective members for the purpose of ending confusion in trade expression and for harmony of construction as to the meaning of trade phrases, names and terms?

3. May a trade association, in cooperation with its members, advocate and provide for the standardization of quality and grades of product of such members, to the end that the buying public may know what it is to receive when a particular grade or quality is specified; and may such association, after standardizing quality and grade, provide standard form of contract for the purpose of designating correctly the standards of quality and grades of product; and may it standardize technical and scientific terms, its processes in production, and its machinery; and may the association cooperate with its members in determining means for the elimination of wasteful processes in production and distribution and for the raising of ethical standards in the trade for the prevention of dishonest practices?

Credit Information

4. May a trade association collect credit information as to the financial responsibility, business reputation and

standing of those using the products of the industry; and may the association furnish such information to individual members upon request therefor, provided such information is not used by the association or the members for the purpose of unlawfully establishing so-called "blacklists"?

5. May a trade association arrange for the handling of the insurance of its members, including fire, industrial, indemnity or group insurance? In other words, can the members of an industry, through the agency of a trade association, arrange for or place all of the insurance of the members?

6. May a trade association, in cooperation with its members, engage in cooperative advertising for the promotion of trade of the members of that association engaged in the particular industry; and may the association engage in such form of promotion by furnishing trade labels, designs and trademarks for the use of its individual members?

7. May a trade association, for and in behalf of its members, engage in the promotion of welfare work in the plants or organization of its members, which welfare work includes sick benefits and unemployment insurance for employees, uniform arrangements for apprenticeship in trade education, the prevention of accidents and the establishment of an employment department or bureau for cooperation with employees?

8. May a trade association, in cooperation with its members and acting for and in behalf of its members, handle all legislative questions that may affect the particular industry regarding factories, trades, tariffs, taxes, transportation, employers' liability and workmen's compensation, as well as handling rate litigation and railroad transportation questions?

9. May a trade association, in cooperation with its members and acting for and in their behalf, undertake the promotion of closer relations between the particular industry and the federal and the state departments of government which may have administration of laws affecting the particular industry in any form?

Trade Statistics

10 (A). May a trade association collect statistics from each member showing his volume of production, his capacity to produce, the wages paid, the consumption of his product in domestic or foreign trade and his distribution thereof, specifying the volume of distribution by districts, together with his stock, wholesale or retail?

10 (B). And may such trade association, on receipt of the individual reports of each member, compile the infor-

mation in each report into a consolidated statement which shows the total volume by districts of production, which, in some instances, include a state or less area, the wages by districts of production, the consumption in foreign or domestic trade by districts, the volume of distribution by districts, and the stocks on hand, wholesale and retail, by districts?

10 (C). And if, after compiling the information as aforesaid, the information received from members as well as the combined information is not given by the association to any other person, may it then file the combined statement with the Secretary of Commerce for distribution by him to the members of the association through the public press or otherwise, and to the public generally, and to all persons who may be in any way interested in the product of the industry, it being understood that the individual reports for the members should cover either weekly, monthly, quarterly or longer periods, as may be deemed desirable by the members, and, when a period is adopted, the report for each member shall cover that period and the combined reports shall be for that period?

11 (A). May a trade association, at the time it collects the production and distribution statistics above outlined, at the same time have its members report the prices they have received for the products they have sold during the period taken, specifying the volume of each grade, brand, size, style or quality, as the case may be, and the price received for the volume so sold in each of the respective districts where the product is sold?

11 (B). And may the association, without making known to any person the individual price reports of any member, consolidate all of the reports into one and show the average price received for the total volume of each grade, brand, size, style or quality, as the case may be, distributed in each district covered by the distribution statistics for the period covered by each individual report?

11 (C). And may the association, after making such compilation, send the compiled report as to average price, as aforesaid, to the Secretary of Commerce, to be by him distributed to the public and to any or all persons who may be interested in the particular industry making the reports?

Daugherty's Reply

In his reply to these questions, the Attorney-General said:

With reference to the first paragraph, there is no apparent objection to a standard system of cost accounting, but I think associations should be warned to guard against uniform cost as to any item of expense. For illustration, a strong effort has been made by some lumber associations to take as a basis for estimating costs of production a uniform charge for stumpage. Of course the cost of the timber in the tree to the different manufacturers who own their timber in the woods greatly varies, and as to each it should be charged at its actual cost. It is as clearly a violation of the law to agree upon the cost of an item that constitutes a substantial part of the total cost price, when its cost actually varies, as to agree upon the sale price, because the sale price is substantially affected by such agreement. It has been ascertained that the members of one association go so far as to fix a uniform cost price, leaving to each member to determine what per cent profit he will add, thus eliminating entirely competition in so far as affected by the cost of production.

Furthermore, I have serious doubts about the advisability of the latter part of the sixth paragraph. I can see no objection to cooperative advertising designed to extend the markets of the particular article produced or handled by the members of an association, but when the several producers or dealers use uniform trade labels, designs and trade-marks it seems to me the inevitable result would be a uniformity of price. Where two competing articles are advertised in precisely the same way and bear exactly the same label or trade-mark, it certainly would be difficult for one to be sold at a higher price than the other, although its quality may be superior. In a way this is illustrated in the cement industry. There a standard of quality has been adopted. That is, it is necessary for all cement to comply with a certain standard, but in practice no manufacturer undertakes to make, or at least no one advertises that he does make, a grade of cement superior to that standard. The result is that there is no com-

petition in the sale of cement so far as quality is concerned. It seems to me therefore that it would be well to eliminate the latter clause in paragraph six, to wit, "and may the association engage in such form of promotion by furnishing trade labels, designs, and trade-marks for the use of its individual members?"

I can now see nothing illegal in the exercise of the other activities mentioned, provided always that whatever is done is not used as a scheme or device to curtail production or enhance prices and does not have the effect of suppressing competition. It is impossible to determine in advance just what the effect of a plan when put into actual operation may be. This is especially true with reference to trade associations, whose members are vitally interested in advancing or, as they term it, stabilizing prices, and who through the medium of the associations are brought into personal contact with each other. Therefore the expression of the view that the things enumerated by you, with the exceptions stated, may be done lawfully is only tentative; and if in the actual practice of any of them it shall develop that competition is suppressed or prices are materially enhanced, this department must treat such a practice as it treats any other one which is violative of the anti-trust act.

In reply to this letter, Secretary Hoover commented further upon the sixth paragraph herein referred to.

Your observations regarding the last clause in question (6) in my letter are wholly sound, based on the language of that clause. It was not, however, my idea that each constituent member of a trade association would use a community trade-mark on his product, i. e., the same trade-mark that was used by every other member of the association, and, therefore, the last clause in that question was unhappily worded. The question really relates to trade promotion through cooperative advertising, in which certain trade slogans are used, such as, "Made in Grand Rapids," which was adopted by the furniture manufacturers at that furniture center. Generally, activities covered in question (6) are conducted by a trade association in a given local community. An organization at Chicago advertises for its entire membership, which includes every line of commercial endeavor in Chicago, that the city is the great central market. It is cooperative advertising of this class that tends to promote trade extension in given lines or collected lines of industry. Certain of the trade associations, however, do devise trade-marks, not for use by all members, but for individual members. It is a well-known fact that when some manufacturer or producer is fortunate enough to select a trade-mark that appeals to the public, it becomes a great aid in selling his commodity and, as a result, it is well advertised until it becomes a household word. Other producers or manufacturers of the same kind of an article, in order to take advantage of this situation, will devise a trade-name or trade-mark as near to that of the successful competitor as they think they can go and still escape suit under the trade-mark or unfair competition laws. The activities of a trade association regarding trade-marks to which I referred in my letter of the third relates to the straightening out of instances of unfair competition or infringement as between the members by undertaking to design trade-marks for the individual members of the association making the same product that would absolutely prevent confusion on the part of the public as to the producer or manufacturer of the given article and, at the same time, remove all claim of infringement or unfair competition. In other words, the trade-mark activity referred to was that of making the trade-marks of each individual member distinctive instead of common. You may, therefore, consider the part of my question (6) referred to in your letter as eliminated from the question, and that the question was really intended to cover the matters stated herein. With this explanation, I feel sure you will agree with me that our views on the matters presented are in complete accord.

Electric Heating from the Point of View of the Central Station

Central Stations Realizing Future Possibilities from Electric Heating Are Conducting Investigations and Encouraging the Use of Electric Energy for Heating Purposes Wherever Possible

By A. STRAUCH
Pacific Gas and Electric Company

ALTHOUGH the electrical industry is approximately forty years old, it is only within the past five or six years that a real effort has been made to develop the heating load. This was probably due to the relatively low cost of other fuels and the lack of appreciation of the many advantages of electric heat, such as ease of control, cleanliness, safety and convenience. It is a fact, however, that in most cases today electric heat is more costly than that produced by other means, but due to the more efficient application and perfect control, it is frequently cheaper in the end. Generally the labor cost is reduced, product improved, rejections fewer, and many times the cost of the finished product is actually less. As a result a comparison on a B.t.u. basis is frequently misleading. This is something that is being learned by experience and is rapidly opening up the industrial field. It is also a fact and especially is it true of the Pacific Coast territory that coal and oil are advancing while hydroelectric energy is decreasing in cost, with the result that many applications considered impossible, a few years ago, are now practicable, and it is reasonable to suppose that as time goes on and our fuel supplies become more and more depleted, the cost will continue to advance and in sections where hydroelectric energy is available it will eventually be cheaper for many heating operations, where at present it is considered prohibitive.

Heating of Buildings

Owing to the climatic and fuel conditions existing in California, and judging from present activities in the way of inquiries, I believe a large load will be developed in this territory for the heating of buildings. This would be very desirable for the reason that a considerable portion of the California load in particular is the pumping of water for irrigation, and since the irrigation demand is low during the winter months, the heating load would be a very satisfactory substitute. I am of the opinion that a majority of the larger central stations at least, and many of the smaller ones, realize the great future possibilities of revenue from this source, and are today conducting investigations and encouraging the use of electric energy for these purposes. Judging from recent progress it would seem reasonable to suppose that eventually the heating load could be made to surpass the motor load.

From the central station viewpoint the heating load is more desirable than the motor load on account of the high power factor as compared with induction motors; heating applications with the exception of arc furnaces, welding machines and

induction heaters operate at practically unity power factor, while induction motors vary from 30% to 90%. It is also possible with many heating applications to obtain a very high load factor in some cases as much as 100% due to the possibility of heat storage, and in many cases the load can be put on at any desired time, with the result that when this load assumes large proportions, it will have a very decided effect upon the entire system. Such loading can probably be largely controlled by rates so designed as to encourage its use at the desired time. Under present conditions anything that could be added between the hours of 10 p.m. and 7 a.m. should be entitled to a better rate than if it were on during the day and early evening. If it were possible to fill in the night valley other rates could be reduced.

The possibilities of commercial and industrial applications of electric heat are many, among these uses might be mentioned hotel and restaurant cooking, bread and pastry baking, water heating, japanning, vitreous enameling, hardening, tempering, and annealing of steel, annealing of glass, heating, melting and welding of metals, applications of heat to shoe, type setting and other machinery, heating of buildings, dehydrating of fruits and vegetables, heating of oil wells to increase the flow, soldering, ironing, and melting glue. These of course are only a few of the many applications of electric heat in industry, but will suffice to convey in a limited way the possibilities of the demand for energy in this field.

A Comparison of Rates

An effort was made to collect some data as to the amount of heating load, rates charged, and what encouragement was extended to further the building of the load by a number of the larger central stations of the Eastern and Central states, as well as the Pacific Coast; but owing to limited time it was impossible to collect a large amount of information. It will suffice to say, however, that almost all replies indicated the stations were alive to the situation, and are encouraging the development of the heating load. It appears that practically all are applying their regular power schedules though some have heating schedules. It is apparent that if a power rate is more desirable it can be applied.

I have found a very great diversity of rates, with the result that it becomes quite difficult to make direct comparisons, but it appears that the Pacific Coast rates are generally lower than those of other sections. About the only direct comparison possible was to work out a concrete case based on rates prevailing in the different localities. This I have done,

taking a vitreous enameling furnace located on San Francisco bay, having a maximum demand of 100 kw. operating at a temperature of 1700° F. It is generally in operation 24 hours per day, average consumption approximately 100,000 kw-hr. per month, and is earning a rate of .96c. per kw-hr. producing a revenue of \$960.00 per month.

The cost of operation in the cities listed below would be as follows:

Boston	\$1782.00 per month rate	1,782c per kw-hr.
Mansfield, Ohio	1705.00 " " "	1,705c " " "
Brooklyn	1625.00 " " "	1,625c " " "
Detroit*	1536.00 " " "	1,536c " " "
Pittsburg	1417.00 " " "	1,417c " " "
Baltimore	1407.00 " " "	1,407c " " "
Los Angeles	1325.00 " " "	1,325c " " "
Chicago	1310.00 " " "	1,310c " " "
Portland, Ore.	980.00 " " "	.980c " " "

*This was a primary rate and 5% was added to cover transformer losses

The demand plus energy type of rate in various forms seems to prevail generally in the East and Central sections, while the Coast rates are mostly of the graduated block type based on connected load. It is interesting to note how nearly the same are the rates at Chicago and Los Angeles; these are based on the schedules of the Commonwealth Edison Company, and the Southern California Edison Company.

Accurate Data Unavailable

It appears that none of the stations have an accurate record of the amount of heating load connected, with the exception of Pittsburg, which reports approximately 25,000 kw. in industrial heating installations, the largest of which is 8,000 kw., and in addition they have approximately 2,000 kw. in bake ovens, cafeteria, cooking, etc., which are earning a rate of from 2c. to 3c. per kw-hr. and competing with natural gas at 45c. per thousand cubic feet. They expect the load to grow rapidly as the gas supply is diminishing, and the price increasing; a 5c. advance is now about to be made. Detroit has approximately 5,000 kw. in metal melting furnaces, and an unknown amount of oven load. Chicago estimates that they have something like 10,000 kw. in heating load.

Pacific Coast power companies fully appreciate the value and future of this load, but no accurate data exists as to the actual amount of such apparatus at present connected to the systems, on account of the fact that a large portion is operating on the regular power schedules with motors. These companies are now investigating all possible uses of electric heat and wherever it appears practicable it is given every encouragement. There are in use by some companies regular heating schedules for the smaller applications which are generally somewhat better than the power rates, but with the larger applications it frequently happens that the power schedules are more advantageous in which case they can be applied.

In conclusion I might say that I believe the electric heating field today offers the greatest opportunity for development of any branch of the industry.

"Kilo Watt" Being Starred in Movie Produced for N. E. L. A.

One Reel Film, "Back of the Button" Features
Service Rendered to the Community by
Power Companies

A FULLER appreciation of the service a power company renders a community is expected to result from "Back of the Button," a one-reel film which has been produced for the National Electric Light Association.

It will also give the public a comprehension of the vast investment that must be made before homes and industries may be supplied with electricity. At the same time it is designed to impress power company customers with the desirability of light company securities as an investment.

Mythology is brought up to date in "Back of the Button," which was produced by the Rothacker Film Company of Chicago. The opening scene shows a young boy playing with an electric train. "Grandpa, what makes the train go when I press the button?" asks Sonny. Taking the youngster on his knees Grandpa begins the story. "Once upon a time there lived in the clouds a great god called Thor, the god of lightning and thunderbolts, which he released at will for the destruction of his enemies." Then flashes in a scene of Thor upon his throne. He's a ferocious looking customer.

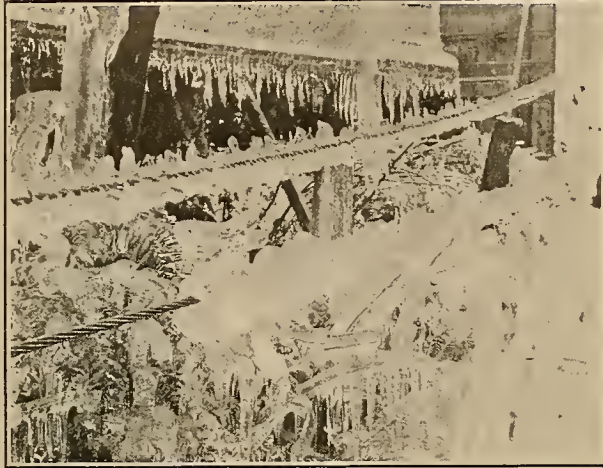
Then we see Thor looking intently at the earth, a corner of which is seen revolving at his feet. Peering through tremendous space Thor sees that the earth is a world of drudgery. He looks into the poorly lighted rooms in which humans dwell. He beholds women slaving over the rubbing board and in sweltering kitchens.

He hurls his hammer and a tremendous flash of lightning strikes the earth. Out of the striking lightning comes a puff of smoke and out of the smoke appears the well known Mr. Kilo Watt, who proceeds to clean up the house by the use of electrical appliances.



Aluminum Cable Steel Reinforced Withstands Storm

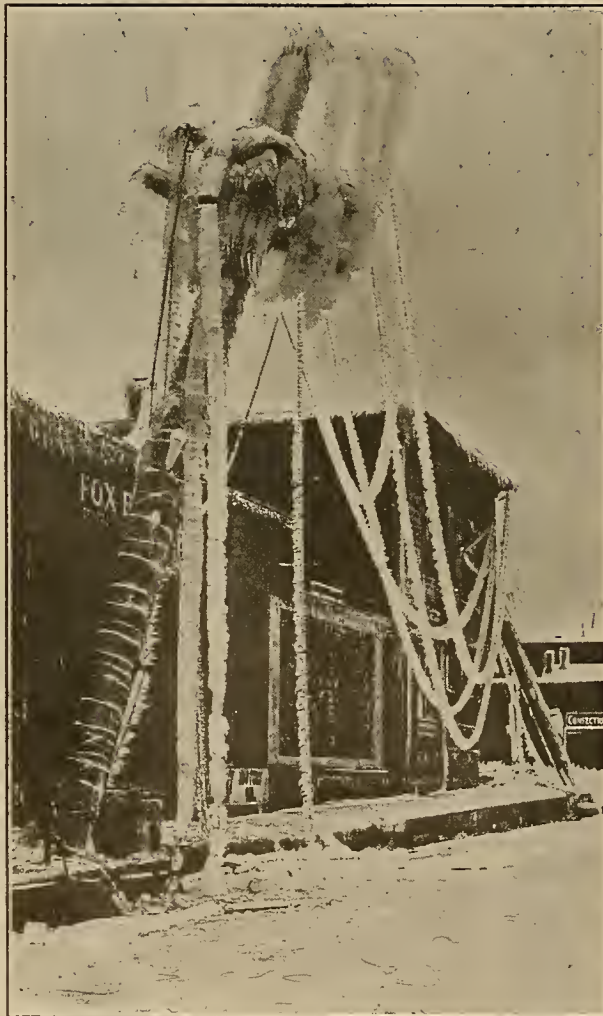
One of a Pictorial Series Featuring Interesting Applications of Electric Service, Advances in Home, Industrial and Power Construction and Noteworthy Developments in Western Progress



Close up view of the ice on the aluminum conductor, steel reinforced. This cable is .633 inch in diameter with an elastic limit of 6470 lb., ultimate strength of 9385 lb. and has a total weight of 343 lb. per 1000 ft., with conductivity equivalent to 3/0 copper.



Transformer pole on Portland Railway Light and Power Company's 60,000-volt Bull Run transmission line. Note the insulator suspended to the aluminum conductor which pulled away from the cross-arm.



Photograph of No. 2 copper conductor used for distributing purposes near the center of the storm area.

A FEW weeks ago, along the Columbia River several miles outside of the city of Portland and including an area of something less than 14 square miles, one of the most severe sleet storms ever experienced in the Northwest spent itself with destructive force, razing to the ground the high tension transmission lines of the various power companies in that district.

Of considerable interest was the performance of aluminum cable steel reinforced in this severe storm area. Between Cape Horn and the Portland city limits on the lines of the Northwestern Electric Co., miles of structure failed, unable to withstand the heavy loading of ice which in many places was estimated at a weight of ten tons per pole. When the storm had passed, 14 miles of poles were down, with cross-arms split or fractured and poles broken at the base and at other points. Only 50 insulators were salvaged. The strain on the conductors must have been extremely severe. The Northwestern Electric Co. reported, however, that not a single instance of conductor failure was found on that part of the system where aluminum cable steel reinforced was used.

The line described above is operated at 60,000 volts. The spans are 300 feet with single pole construction. At the angle and terminal points, standard H frame construction is used.

The photographs shown, which were furnished by Howard W. Flye, of the Aluminum Company of America, San Francisco, were taken the day following the storm, after several hours of warm rain.



Ice on Northwestern Electric Company's White Salmon transmission line reached in some cases a diameter of eight inches, with an estimated weight of ten tons per pole.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

THE GOODS OFFERED FOR SALE

The following outline does not cover, by far, all that you should know about the goods you handle, but if you prepare for yourself a private "sales-manual" covering thoroughly the several points brought out here you will very seldom be stumped by any question of your prospect.

The Construction of Your Product

The layman very seldom knows just how things are made and from what they are made, but he does not like to show this ignorance. Hence it is entirely up to you, and to your knowledge and tact, to overcome that first feeling of embarrassment.

The external appearance of your goods is the thing that first attracts the customer's attention. Manufacturers know this very well, and usually give special thought to finish and workmanship. By showing these to the prospective buyer from the start you will frequently be able to gain the great psychological advantage of predisposing him in favor of your product. Pay particular attention to the finish of the product. The majority of good and marketable articles now produced in the national field are finished with a view to the longest and greatest possible wear. Do not expect the customer to know which finishes are superficial and wear off quickly, and which are put on to last. Learn that yourself, and put your best foot forward from the beginning.

Materials Used in Your Product

You may be selling a washing machine. Would you know whether its tub is all copper; copper lined; all zinc; copper lined sheet steel; galvanized steel; or—finally—rust resisting steel? And can you intelligently compare these materials to me, so that I, the buyer, will know their comparative qualities as materials for washing machine tubs? Is the cylinder of your machine of zinc or of wood? And if the latter, of what kind of wood? Why wood? Why zinc? Are all woods equally good for this purpose? Why, or why not? You can, and you should, ask yourself this kind of questions about practically all important materials entering into the product you sell, and you should be able to discuss these materials with your customer.

Technical Details of Your Product

The manufacturer of your product usually furnishes you with a technical description thereof in which all important details are described at length. I do not have to tell you that you should study these technical specifications. But I do have to tell you very insistently that you should not inflict these

technicalities on the poor layman you try to sell your goods to. The layman who buys your goods usually does not understand the conventional language of your profession—he has ordinarily only one common language with you, the English of the street and of the home, not the English of your shop. Study the important "selling" details of your goods. Translate their technical descriptions carefully into the layman's language. Then only can you be sure that you will be able to drive your technical selling points home. Even then, avoid excesses. He is buying your vacuum cleaner to use it, and not to place it on a stand and walk around it, admiring its fine points.

And that brings me to the next item. You are interested in whether the product you handle will sell or should sell. I, the buyer, am not interested in this at all. I want to know whether my household people—and they are neither skilled mechanics nor very careful people—will or will not be able to use this machine when they want to use it.

Simplicity and Durability of Your Product

Shall I have to hire a licensed engineer to operate the electric range you are trying to sell me? Shall my wife engage a chauffeur to run the washing machine you are offering her? These are the thoughts we unsophisticated buyers have when the average electrical salesman shows us this or that appliance, and falls all over his own feet in trying to describe it to us. The reason being, of course, that he has not studied his product intensely enough. Most of the apparatus sold nowadays is designed for the use of just such people as I and my wife, and not as you and other specialists. Most appliances are very simple, and most salesmen who neglect to study them thoroughly make them look very complicated.

Study not only the simplicity of your product, but much more than that, study the method in which you present it to me so that I also, from my viewpoint, will be thoroughly impressed by its simplicity.

The latter half of the year 1920 saw the passing of the man who bought things just for the fun of buying and owning. Today, we don't buy, we invest, and if we invest, say, \$150.00 in a washing machine we do not want to spend \$25.00 or more every year keeping it in running order; neither do we expect to buy another machine for quite a number of years. Of course, when you sell us your machine you tell us that it will last a lifetime, and that we shall never have to spend a penny on running repairs; you all say the same thing, and we do not believe any one of you. The only thing we will believe are reliable

records. Can you produce these? Have you taken the trouble—and I grant you, this may mean quite some trouble—to supply yourself with such reliable records? Otherwise do not make extravagant claims because we would rather have you give us meager information on this point than tell us things which are palpably unsupportable.

Usability and Standing of Your Product

The first man who tried to sell my wife a washing machine had one sufficiently large to accommodate the needs of a boarding house for 20-25 people; and the second one spent about an hour and a half rather ingeniously trying to sell to her—and we have a healthy nine-year-old son—a machine of Lilliputian dimensions suitable for a couple of college girls living in a two-room “suite” and laundering only their blouses and lace handkerchiefs.

I grant you that you want to sell your product, but please understand that I want to buy only that which I can use under my circumstances and conditions of living. Show me definitely what your machine will do, and what it will not do. Tell me definitely under what conditions this or that product you handle will or will not be well adapted to my needs. If you do this for your prospects, you will sell. But to be able to take that viewpoint you will have to put a considerable amount of thorough and personal study into the game of selling.

Even if your particular brand of the product you are selling were the only representative of that article on the market we—your prospective and potential buyers—dislike to be the dogs on whom it is tried. We want to know all about those who already have used it. The more you know about this, the better for your chance to sell. But, mind you, your knowledge must be specific, not general.

Of course, “everybody” is buying your brand. But how many “everybodies” have bought it right here in town? how many have been sold in the U. S. during the last twelve months? How many dealers in the whole country are handling it?

Its Reputation and Popularity

These and similar questions dealing with the popularity of your product you must be able to answer right off the reel. In most cases they will be eagerly supplied to you by the manufacturer and wholesaler. Get them, study them, and use them for all they are worth. More people buy things because many others have done so than because they are “pioneer buyers.”

Endorsements and references of a local character are among the most valuable assets you may acquire with reference to your product. Be assiduous in procuring them, but be careful in using them. The wife of a labor union leader may be adversely impressed by the opinion of the leader of the local “Four Hundred,” and vice versa.

Every manufacturing concern will gladly supply you with authentic information concerning its past history, its size and importance, and—in particular—its reputation. Get it, study it, but quote it with moderation and tact. Many of us are prejudiced

against “captains of industry,” “malefactors of great wealth” and “trusts” in general.

About Your Competitors

I do not have to tell you to study competitive products very closely and in much detail, in fact, point by point, because you are probably doing this anyway. And, quite probably, I do not have to remind you either of being very, very careful when you compare your product with a competitive one before a prospective buyer. I presume you have been told very often and very pointedly that knocking your competitor never, never sells your goods. This is all quite elementary, and practically every salesman learns this at the outset of his career. But there is another angle to the question of competition of which you may not have happened to think.

In former times we were all convinced that in a given community during a given selling season a definite and unchangeable amount of money was going to be spent, say, on pianos; another just as definite amount on automobiles; and then again quite a definite amount of electric ranges. As a result of this conviction of ours we went into the selling game with the purpose of getting at least “our share”—and if possible, much more—of this definite sum that was going to be handed out this spring or fall for all the electric washing machines together. And, of course, this led to the acutest and severest form of competitive selling, with all the implied and unescapable accompaniment of mutual recrimination and accusation of unfairness and what not.

Modern investigation has disclosed the astonishing and still widely unknown fact, fully vouched for by the most unbiased and competent investigators, that this is not at all so. That the total “spending fund” of the community is not apportioned rigidly in advance between the various articles which it will buy. On the contrary, that the various things—pianos, phonographs, clothes, electric appliances, automobiles, jewelry, furniture, etc., all compete against each other for a share of this “spending fund.” In other words, that if you sell electric ranges your true competitor is not the seller of another brand of electric range, but the furniture man, the jeweler, the phonograph merchant.

Hence this most important practical lesson. Do not try to sell me your M.N.O. brand electric range as against the possible competition of the P.Q.R. electric range—sell me the idea of the electric range first, and sell it to me so hard that I will not go and spend this money on other things but will become convinced that the other things can wait.

Cultivate this attitude. Learn this new kind of competition, and you will be discovering very soon that your rival of the P.Q.R. range, with all his mean little competitive tricks, is really asleep right in front of a very large and quite uncultivated field for ranges in which you can easily reap a rich harvest.

Readers who have been following this helpful series may have noticed the omission of the name of Mr. Russell above their copies of lessons four and five. The omission was unintentional and somewhat of an injustice to Mr. Russell, whose important work in this field gives particular weight and interest to these articles.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Montana Power Co. Sets Merchandising Record

Appliance Sales Following Intensive Advertising Campaign Total More Than Business for Two Preceding Years

Four thousand five hundred and three. This is the number of electrical appliances bought by the people of Montana during the Montana Power Company's merchandising campaign held during the month of December. This totals more electrical appliances than the company had sold during the two years prior to the campaign.

Considering the depressed economic conditions, the brief selling period and the fact that the maximum potential selling field is confined to the company's 32,000 residence lighting customers, the results are quite satisfactory. Expressed in dollars, the sale represents turn-over of \$44,000 worth of stock. In terms of possible additional load, the sale of these appliances to consumers on the power company's lines means an addition of 1701 kilowatts.

A survey of the general operating situation, made in September, disclosed the probable loss in revenue for 1921—due to the nine months shutdown of the mines, mills and smelters of between \$1,500,000 and \$2,000,000.

In casting about for some means to get additional load on the lines, the natural thought was that the residence lighting revenue might be increased slightly, if not liberally, by stimulating the use of electrical household appliances.

The advertising director outlined the proposed advertising campaign, beginning with twelve weeks of an educational series entitled "Her Majesty, Montana." It was suggested that this series be followed by an intensive three weeks' selling campaign of electrical appliances with a view of testing out the sales effect of merchandise publicity and of the seventy newspapers carrying the company's advertising.

The campaign was calculated to help achieve an equally important result, viz., to bring the eight branch managers into closer association, to effect a better selling organization throughout the system and to build up the morale among the company's representatives.

With the launching of the campaign the efforts of the publicity and sales organizations began to bear instant fruit. In addition to the newspaper advertising, 44,000 reproductions of the first advertisement of the series previously published were distributed pro rata among the branch managers and were sent out as "stuffers" in the monthly bills to residence customers and by house to house delivery. A second lot of reproductions of one of the later advertisements were sent out during the middle of the campaign in a similar fashion.

As an additional aid in merchandising the appliances an Ajax two-way plug was given free to the purchaser of each appliance.

The net result of the splendid team work of the entire sales organization is shown in the fact that for twenty-one days, the organization maintained a daily average of 214 appliances sold or a total for the campaign of 4503.

Intelligent and effective cooperation by branch managers was shown in the window trimming, practical demonstrations and special entertainments put in many if not all of the branch offices.

To sum up, although the estimated revenue from current supplied to the appliances sold will not exceed more than \$20,000 per year, the company feels that the sale has accomplished the following:

1. It has built up a real selling organization for subsequent use when needed.
2. It has improved the morale and increased the self-respect of all employees.
3. It has pleased the public by giving them appliances at prices previously unattainable.
4. It has demonstrated the effectiveness of commercial newspaper advertising.

Patent Medicines Invade Field of Electrical Industry

Within recent months the entire country has been flooded with extravagant claims of the advantages to be gained by the use of patent solutions or gellatines as substitutes for the normal acid electrolytes in storage batteries.

Manufacturers and dealers at first were inclined to underestimate the harm which might follow the advent of these patent medicines. According to recently published statements by large battery manufacturers many of the claims are ridiculous when submitted to analysis from the standpoint of battery chemistry. In actual tests these electrolytes prove to be nothing of value so far as contributions to the accepted standards of storage battery engineering are concerned. Dealers are taking the trouble to carefully warn their customers of the possible dangers incurred in not following the instructions which accompany all batteries sold.

Women are the country's buyers, whether in purchasing a house, furniture, electrical appliances or clothing. Christine Frederick, a prominent household economist of national repute, has stated that women purchase 48.4 per cent of all merchandise for family use and have an important voice in the selection of 23 per cent more, making a total of 71 per cent bought by women.



EFFECTIVE CENTRAL STATION DISPLAY

The Great Western Power Company of San Francisco is engaged in forwarding the sale of heating appliances with a view of increasing the company's load. The above view shows the booth of the company used at a recent industrial show in conjunction with its campaign.

Southern California Contractor-Dealers Improve Stores

New Stores, Remodeled Establishments and Many Innovations Meet Increasing Demand From Public for Improved Tactics in Merchandising Electrical Appliances



The F. E. Newbery Electric Company, Los Angeles, owned by Glen Arbogast, has catered to the public of that city for fifteen years. The growth of the store is indicated by the above view

of the appliance department. The company has recently spent a considerable sum remodeling the entire establishment and has installed a special department devoted entirely to lamps.



The J. A. Newton Electric Company of Glendale, while specializing in contracting has found it advisable to devote considerable space to the merchandising of appliances.



The Golden State Electric Company, Los Angeles, outgrew its old establishment on Seventh street and opened the above new store on February 15. Contracting is its specialty.



The W. A. McNally Company, for eight years one of Pasadena's most enterprising contractor-dealer establishments, has this imposing building for transacting its business.



This is one of the Los Angeles Stores of Goodhousekeeping Shops, Inc., owned by F. A. Clarke. The show window was recently arranged so that it would swing inward leaving the store front open to the public.



Denver Sales Force Establishes Vacuum Cleaner Record

By piling up a 3000 per cent business increase in six months, a Royal cleaner sales force, operating in connection with two large retailers of Denver, demonstrated beyond question the power of the fighting spirit.

Local sales for their product were in this sickly state of affairs: Where the average progressive community will have one electric cleaner in every three wired houses, in Denver a leading competitor alone had already sold his cleaner to one of every four homes. There were 15,000 cleaners of other makes in service in this city of 270,000 population and so few Royals that they didn't count. It appeared that competitors had a strangle hold on an almost saturated field.

It was under these adverse conditions that a healthy mental attitude and an unlimited amount of work put over the 3000 per cent increase. Six green men whose main qualification was a real desire to work began to canvass all day and study most of the night. They refused to devote a single precious moment to the prevalent laments—"Business is dead"—"Buyers are on a strike"—"Competition is too strong." Instead, at the end of each strenuous day, they headed for the salesman's training school.

An intensive advertising campaign and a well arranged demonstration both aided in making the record.

After six months of this, P. R. Conley and R. T. Ginn, who officered the campaign, were able to report that Denver instead of being a lost hope was a coming field, one dealer having sold twenty-one times as many Royals as were ever sold in Denver in any one year, and another dealer sold ten times as many as the best previous yearly total.

Publicity as a Means of Benefiting the Industry

Value of News Columns of Daily Press Underestimated by Electrical Men in Giving Public the "Electrical Story"

By R. G. EMERSON

Field Representative, Northwest Electrical Service League

That the right kind of publicity will accomplish much for the good of the electrical industry is readily apparent, yet there is, perhaps, no other avenue of enterprise which we of the electrical industry have so consistently avoided.

In our individual and collective endeavors to further the progress of the electrical industry we are usually concerned with three objectives: to educate the public as to the importance of the industry; to demonstrate the advantages of doing it electrically and thus stimulate sales of service and supplies, and to unify the whole electrical industry.

Publicity will achieve all three of these ends.

And by "publicity" we mean items and editorials favorable to the industry appearing in the daily newspapers. Publicity is differentiated from advertising by the fact that one is "paid space," while the other comes under the head of "news." Because of the obvious impartiality and greater authenticity of "publicity" it is that much more effective than the usual run of advertising.

If we recognize the importance of proper publicity to the electrical industry the question arises as to how we—the individual members of the industry—can increase the amount of favorable publicity. If the following paragraphs aid in answering this question they will have served a good purpose.

First of all there are the editorial columns. Every editor has his moments when he's wondering upon what subject he'll write his editorials for the next

day. The electrical men of the community should keep the editors supplied with interesting material regarding the power possibilities of that community, or the advantages of "doing it electrically." Valuable educational publicity will result.

As regards the news columns the answer is much the same. Let us remember that whatever is "news" is wanted by the city editors. "Today's news today" is the unwritten slogan of every successful journalist and he will appreciate any "news" information that you can give him. If there is a meeting of the electrical men, if a "big" electrical man comes to town, or if anything at all happens which contains favorable mention of the electrical industry and which is news, phone the city editor. Electricity is a most interesting subject and every day there are many possibilities for constructive publicity.

If there is a cooperative electrical page in one of the local papers the editor of that page will appreciate all the electrical material dealing with the local field we can give him, as he has to rely upon the trade journals and manufacturers' publications for most of his news matter.

Probably the most effective way to handle local electrical publicity for the editorial columns, the news section, or the electrical page is to have an individual or a committee responsible for sending material to the papers. If there is an electrical club or similar organization it is a good plan to have someone in charge of this work.

Publicity, then, is a very important factor in the development of the electrical industry and should be recognized as such.

Unique Display Calls Attention to Repair Department

By J. T. BARTLETT
Boulder, Colo.

They have been much joked about, those old-fashioned patent medicine advertisements which depicted a user before and then after taking, but at that, they were highly effective. The same idea in a display advertising its repair department was recently used by the Denver Gas and Electric Light Company.

It took up just a little room in a window which also advertised various electrical goods. The "pieces" of a wrecked iron were thrown together. It resembled a pile of junk. It had been, you would say to look at it, through half a dozen fires, a train wreck, and a flood. A card placed beside the "remains" was lettered, "Before." A foot away, to the right was a resurrected iron, described by a card, "After." It looked like a brand-new iron.

It was a telling method of impressing on people how elaborate repairs a good repair department can make. A large card in the rear of the display began, "Yes, We Repair Irons, Percos," etc.



Six salesmen piled up a three thousand per cent business increase in Denver recently in the sale of Royal vacuum cleaners. The above demonstration booth was one of the means they employed in making this record.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Northern Railroads Expand

Purchase of Branch Lines by Great Northern and Northern Pacific Taps Timber Land

Timber owners whose holdings are in the northwest corner of the state of Oregon are elated over the acquisition by the Great Northern and Northern Pacific systems of the Gales Creek and Wilson River Railroad. The purchased line, built by the Washburn timber holding interests, is fourteen miles in length, from Wilkesboro, the westerly terminus of the United Railways line, to Agaard. This purchase followed closely the acquisition by the Great Northern and Northern Pacific of the Portland Astoria & Pacific line, constructed from Wilkesboro to the center of Nehalem valley, thirty-three miles. These purchases were made undoubtedly for the purpose of extending feeder lines to develop and hold the prospective immense timber and lumber traffic from the great forests of northwestern Oregon. The Northern Pacific and Great Northern are joint owners of the United Railways system and the Spokane, Portland & Seattle Railway Company's lines now partially serving this section of the state.

These purchases are said to mark a move on the part of transcontinental railroads to provide transportation facilities to the yet comparatively untouched timber resources of the northwestern part of the state of Oregon and that it is probable that the Southern Pacific and Union Pacific systems will in like manner make purchases and extensions to meet the needs of the timber owners.

Difficulties of transportation and the almost prohibitive freight rates made by trunk lines on logs to the Willamette river are forcing sawmills more and more into the timber.

Washington to Spend \$6,550,000 on Highway Program

The state of Washington's highway program for the year 1922 includes the grading and graveling of more than 135 miles of road, and the paving of approximately 60 miles, at a cost of approximately \$6,550,000, according to State Supervisor of Highways, James Allen. Construction for the most part will be the improvement of the eight great arterial highways: the Pacific, Sunset, National Parks, Olympic, Navy Yard, Ocean Beach, North Bank and Inland Empire. Approximately \$2,000,000 of federal money will be available for use, the state will furnish \$3,000,000 and the U. S. Forestry Department will expend approximately \$300,000 toward the improvement of forest roads.



View of the new eleven-story building recently completed by the Pacific Telephone and Telegraph Company in Seattle. The structure cost \$1,500,000.

Telephone Company Completes New Building in Seattle

The new eleven-story building of the Pacific Telephone and Telegraph Company, recently completed in Seattle at a cost in excess of \$1,500,000, is the finest structure erected in the northern city since pre-war days.

This structure, of steel frame construction, faced with terra cotta and brick, stands on the corner of Third Avenue and Seneca street. In size it is 118 by 120 ft. It is now occupied by the business offices of the telephone company and at the present time work of removing the various downtown exchanges into the building is being pushed forward rapidly.

The general contract for the erection of the building was held by the Sound Construction and Engineering Company; the electrical wiring by NePage McKenny; the plumbing and heating by Eckart Plumbing and Heating Company, and the elevator contract by the Otis Elevator Company.

The building was designed by E. V. Cobby, San Francisco architect.

Stockholders of the Utah Construction Company, Ogden, have approved the action of the board of directors in authorizing a bond issue of \$1,250,000. The bonds of the company have been subscribed, and the final arrangements for refinancing the company are now being made.

California Mines Are Active

Report of P. G. & E. Shows Large Increase in Mining Load

Considerable activity of late has been noticed in the resumption of the mining industry throughout northern California, particularly in the Mother Lode section. This activity has been encouraged and, in some measure, made possible by the availability of a dependable and adequate power supply at attractive rates.

Mining companies are rapidly becoming convinced of the ultimate economy in utilizing electric power in all their operations, wherever it can be applied in a practical way. Gasoline and steam power are gradually being replaced in this industry by the electric motor, and it is anticipated that, at no distant date, practically all the large mining companies will be operating exclusively by electricity.

As indicating the activities in the mining field, the Pacific Gas and Electric Company has, within the past few months, either made original installations or added to those already being supplied to the following:

Bonanza mine, Moore Mining Co., San Andreas Dredging Co., C. C. Fox, Normandy Mine, American Gold Dredging Co., Milkmain Mine, Evening Star Mine, E. C. Montgomery and Balakala Copper Mining Company. From Tuolumne county come applications for electric service to the following concerns: Chilano Mine, Chrystalline Mine, Santa Ysabel Mine, Spring Field Tunnel & Development Co., City of San Francisco, Columbus Mine and Buckhorn Mine.

Numerous statistics are available to show that electricity is not only replacing other methods of power in mines, but has proven more economical in operating costs. R. E. Fisher, vice-president in charge of sales of the Pacific Gas and Electric Company, makes the following statement:

"During the year 1920 the average kilowatt-hour rate in the mining industry was 1.123 cents, while our average system rate for the same year was 2.068 cents, showing that the mining industry paid a rate far below the general average over the system."

City Attorney Grant, of Portland, has given an opinion that if overhead wires are dangerous, the city council may order them placed underground, but that such order must not be arbitrary. The opinion was given as the result of a request by residents of a certain section of the city that overhead power lines be placed underground in connection with the improvement of an important thoroughfare.

Report Scores Government Ownership of Utilities

N. E. L. A. Makes Public Findings of Engineers Appointed to Investigate Ontario Hydro Electric Commission's Progress

Government ownership and operation of electric light and power utilities, as exemplified by the Hydro Electric Power Commission of Ontario, is not a success, from the viewpoint of either service or low cost, as compared to privately-owned and publicly-regulated electric light and power companies in the United States and Canada.

This in effect is the outstanding conclusion in a report made to the National Electric Light Association by the engineering firm of Murray and Flood of New York City, and just released for publication by that Association. It is buttressed by a mass of contributory evidence gathered first-hand by the engineering firm in an exhaustive investigation begun on August 22, 1921, and covering the period up to February 10, 1922, when the report was presented.

The report is of particular interest to the West in that at the present time California is planning a similar undertaking in the proposed \$500,000,000 Water and Power Act which will be voted upon by the people of the state in the November election. In recent years other western states have considered similar tactics, notably in the case of Washington, where considerable agitation was made to adopt a system of state ownership of utilities in recent years.

The printed report contains more than 225 pages of printed matter and charts. In it the engineers trace the development of the Hydro Electric Power Commission of Ontario since its inception. They compare its growth and operation with the growth and operation of electric public utilities in the Province of Quebec and in sections of the United States, and give comparative and pertinent statistics on the bonded debt, revenue, operating expenses, taxes, wages, etc., of municipally-owned and privately-owned Canadian electric utilities.

The engineering firm making the report is comprised of Mr. W. S. Murray, who conducted the Super-Power Survey on the Atlantic Seaboard between Boston and Washington for the United States Government, and who in addition is conversant with Canadian conditions, having acted in a consulting capacity for municipal and provincial bodies, and Mr. Henry Flood, Jr., formerly Engineer-Secretary of the United States Government Super-Power Survey Organization.

The investigation was made for the purpose of obtaining complete economic data from which to draw a comparison between governmentally-owned and privately-owned utilities. This naturally led to a consideration of the political and economic structure of the Hydro Electric Power Commission of Ontario, which operates the largest government-owned system in existence, and to a comparison between that system and others privately-owned and operated, but subject to public regulation both in the United States and Canada.

In the report Mr. Murray is careful to state that it is not intended to dim the glory of the achievements of the Hydro Electric Power Commission of Ontario, which, he says, has replaced

certain unregulated private utilities whose operation was far inferior to it. The principal problem was to determine whether there was anything in the Ontario plan to commend it for application in the United States.

It shows that the service rendered by privately-owned utilities under public regulation is cheaper and better than that rendered by governmentally-owned utilities, and that even in Ontario, which has what is generally looked upon as the most successful example of government-owned utilities, private capital and enterprise have contributed more to the upbuilding of civic, industrial and commercial life than has the government-owned project.

In the summary of conclusions at the front of the report appears the following:

"After careful analysis of the government-owned, controlled and operated electric utility structure as represented in the Hydro Electric Power Commission of Ontario, I am of the opinion, firstly, that the principles of its application can find no place in the United States; secondly, that to attempt the substitution of its principles of control and operation within the United States would be to strike a blow at economic structures, the present existence of which are not only far better equipped to protect the public interests in their conjunctive relation with the public service commissions of the states regulating their rates, but it would also be to strike an equal blow at the shareholders of the electric utilities which are now serving the American public; and, thirdly, that the Hydro Electric Power Commission owes its being only to the fact that a public service commission on the order of those operating in the states was not in existence in the Province of Ontario at the time of its creation."

In support of the above statement the report recites that in order to be superior in kind to that supplied by the privately-owned electric utilities of the United States, power as applied in Ontario from the governmentally-owned and controlled system, in associate relationship with the Hydro Electric Power Commission, must be more adequate, more reliable and cheaper. "The facts show, however, that the electric utilities of the States hold more power in reserve and sell more energy per capita served," says the report, "that, by that token they can claim a greater reliability of supply and that the supply is cheaper to the consumer."

Also in support of the statement of conclusions the report asserts that at the end of the fiscal year 1920, only 23 per cent of the total power plant capacity operated by the Hydro Electric Power Commission was constructed by the Commission, the remainder representing plant capacity constructed at the initiative and risk of private investors and acquired from those investors by the Commission. The report states that in acquiring ownership of it, intangibles such as franchise rights and good-will were included in the purchase price. This intangible cost, therefore, being represented in power "at cost" such intangibles also necessarily would be included in the cost of any governmental plan of like characteristics which might in future be inaugurated in the United States.

"The building of new power plant facilities under the auspices of governmental ownership, as shown in the cases of Nipigon and Chippawa, both in re-

spect to policy and cost, is not to the economic interest of the people," continues the report.

"The advocates of government or municipal ownership of electric utilities claim reduction in the cost of power in virtue of

- (a) Elimination of taxes.
- (b) Elimination of dividends.
- (c) Elimination of high-salaried executives.
- (d) More economical wage and higher efficiency in labor scale.

"With regard to (a), taxes are not eliminated. Just as much money in taxes is paid. The difference is in their distribution. In the case of private ownership only the users of service pay the tax bill, while in the case of government-owned utilities all the people pay the bill.

"With regard to (b), (c) and (d), notwithstanding dividends, high-salaried executives and the wage and labor claim, the answer is, when the total operations are summed up, the people receive the power at less cost through private ownership under regulation.

"The investment of capital in electric utilities under private interest control is far better protected from extravagance than when that capital is governmentally-owned, for the reason that plans and estimates for such capital expenditures not only must gain the approval of a trained engineering and managerial staff and an experienced board of directors of the companies, but it also must have the critical review of the banker and the private financial investor. In the case of government-owned utilities, the directing heads are seldom specially trained in the business under their jurisdiction and the value of securities is not based upon the value of the property or the efficiency of the management, but upon the taxing power of the government.

"Arms, legs and body are useless without the head. A high-salaried executive usually saves many times (his salary included) the losses incurred by the cheaper and less efficient executive. Accomplishment by individuals in control of private enterprise is under keener observation than is the case when those in charge are governmental or municipal officers.

"Governmental ownership eliminates all incentive for gain and throttles initiative. This is evidenced by the far greater growth of privately-owned utilities.

"The Hydro Electric Power Commission is the judge of its own acts. A commission cannot fairly be the judge of its own (and others') rights in contentions."

Further in support of the conclusions drawn, the report calls attention to the fact that "honesty of purpose does not necessarily reduce the power bill" but that so far as price is concerned, the structure under which it is administered is what really counts. The report says that American companies in the Niagara district are supplemented by steam power far more than are those on the Canadian side, but that in spite of this increased cost for the benefit of the consumers and the public generally, power is being furnished at a lower cost on the American side than upon the Canadian side under the direction of the Hydro Electric Power Commission.

In discussing the relative value of the governmental structure as represented by the Hydro Electric Power Commission of Ontario, and the regulatory bodies of the several commonwealths of the United States, the report says:

"The Commissions of the States fully realize that protection to the people lies in protection to the electric utilities from which they are receiving power. The authority delegated to them to regulate rates, and the constitutionality of the law standing behind any action on their part, or upon the part of the electric utilities, provides a structure constructively balanced to do justice to all parties."

San Francisco is becoming the raw hide center of the Pacific Coast, according to steamship agents whose vessels are bringing the hides into coast harbors from the Orient and South America. Recently two vessels brought a total of 74,000 hides into the port from South America in one week.

Denver Industrial Show Visited by 75,000 People

Seventy-five thousand people attended the Industrial Exposition held in the municipal auditorium at Denver, February 20-25. The Colorado Manufacturers' Association took the lead in arranging the exhibition and the results obtained were unusually satisfactory, according to the officers of the organization and the several hundred exhibitors.

The exposition was a revelation to many, to see the extensive range of goods manufactured in Colorado. Although believed by many that the state is a mining and agricultural one, the exposition demonstrated that manufacturing is in the ascendancy and that Colorado has added another potential factor to give it the lead in the Rocky Mountain country.

Everything from perfumes to overalls were displayed at the exposition. Foodstuffs, wearing apparel, toilet articles, mechanical equipment, stationery, electrical material and appliances, and even caskets were shown. In those cases where certain articles were not being manufactured in the state, arrangements were made for "foreign" displays.

The Colorado-Made Goods Club, representing 40,000 women in the state, had its officers and committees working at every session. Their function was to give personal touch to each of the exhibits and to drive home the idea of supporting home industry by buying Colorado-made goods.

Two Denver electrical firms maintained attractive booths. One was that of the J. W. Hancock Electrical Co. displaying its hand-wrought lighting fixtures and Columbalite units, and the other was of the Enterprise Electrical Company, which was responsible for the wiring and electrical displays of the entire exposition. Assisting in the Hancock display was the firm of A. and H. Hosek, Denver manufacturers of wood fibre and polychrome products.

Reports from these firms since the exposition closed indicate that the displays and demonstrations have already resulted in sales of several thousand dollars, ranging from small appliances

and portable lamps to complete jobs of house wiring.

The Electrical Cooperative League of Denver assisted the electrical firms with their displays through advertising and personal assistance. S. W. Bishop, the League manager, was in attendance to explain the electrical home which will be opened in that city early in April. Literature explaining the nature of the home and extending an invitation to visit it was passed out to thousands of visitors.

Electrical Home Is Dedicated by Provo, Utah, Electricists

A model electrical home has just been completed in Provo, Utah, and was open to the public from March 1st to 5th, inclusive, during which time a great many interested visitors were in attendance.

The home is located at 450 North University Avenue, and is one of the finest in the city.

Among the features exhibited in the home were the following:

- Convenience outlets.
- All attachment plugs standardized.
- Convenient location of switches.
- Outlets on dining room table and tea wagon.
- Modern electric kitchen, with electric dishwasher and electric range.
- Modern lighting fixtures, wherein glass reflectors were eliminated as much as possible.
- Modern laundry room, completely equipped with electrical operation.
- Burglar lights on four corners of the house, operated by switches from either front door or bed room.
- Convenience outlet placed on the outside of front porch for outdoor lighting or appliance use.

On Thursday, March 2nd, members of the Rocky Mountain Electrical Cooperative League and the Electrical Contractor-Dealers' Association of Salt Lake attended the demonstration of the home. A feature of the program was a luncheon given in honor of these electrical people.

The home is owned by Swen O. Nielson.

The City of Seattle's Skagit River development project offices, formerly located at 116 Cherry Street, Seattle, have been moved to the Alaska Building.

Great Western Power Co. Buys Universal Properties

The Great Western Power Company of San Francisco has purchased outright the name, good will and properties of the Universal Electric and Gas Company of that city for \$2,250,000, according to an application filed with the California State Railroad Commission requesting the approval of the purchase. Under the terms of the agreement reached between the two companies, the Universal Company will receive an initial payment of \$500,000 immediately and the remainder of the purchase price within ninety days in addition to an amount covering extensions and equipment installed since January 1, 1922.

The properties of the Universal Electric and Gas Company include a steam generating plant of heavy capacity, eighty-one miles of primary overhead distribution lines, fifty-three miles of secondary overhead distribution lines, forty-six miles of underground cable and seventy-four miles of underground ducts. It now serves in that city 4250 consumers.

R. J. Spreckels signed the application to the Railroad Commission, as vice-president of the Universal company, together with R. C. Bokee, assistant secretary, and Mortimer Fleishhacker signed for Great Western, as president, together with Chaffee E. Hall, as assistant secretary.

The Great Western guarantees to abide by any outstanding contracts Universal company holds and to indemnify that company for any claims arising prior to March 1. Universal company agrees to practically disband, inasmuch as the contract agreement calls for the Universal company not to engage in any electric or steam business in San Francisco so long as the Great Western continues in business.

The City Electric Company of Albuquerque, N. M., is building a series of residences for the employees of its plants in that city. The homes, which will cost approximately \$2000 each, follow what is known as the Roslington Standard, and have been designed to minimize labor and material.



Booth of the Enterprise Electric Company at the recent Denver Industrial Exposition. Harry Arthur, owner of the company, made the electrical installation.



Booth of the J. W. Hancock Electrical Company displaying hand-wrought lighting fixtures, a product manufactured by the Denver firm and having national distribution.

Plans Ready for New Los Angeles 1000 Room, \$7,000,000 Hotel

Schultze and Weaver, architects of New York City, have filed plans in Los Angeles for the Biltmore Hotel to be erected at Olive and Fifth streets, facing Pershing Square.

When this hotel is completed it will represent an investment of close to \$7,000,000 in property, building, and furnishings. With its fourteen stories of more than one and one-half acres each, it will contain 950 guest rooms and the most elaborate arrangement of lobby and service floors in the West.

Approximately 6,000 tons of structural steel will enter into the construction of this building. The electrical equipment of the hotel is estimated to cost \$500,000 including elevators, ventilating apparatus, refrigeration machinery, wiring and other electrical devices.

Seattle Offers Off-Peak Power at Decreased Rates

Three industrial power rates for the Seattle light department were recently recommended by Superintendent of Lighting J. D. Ross. These would be for power supplied during the peak load, or greatest evening demand, off-peak power, and waste power. The city council has under consideration an ordinance providing for reduced rate for manufacturing plants during off-peak hours. Mr. Ross states there is also waste power available, which could be disposed of at a still lower rate, this waste power being produced by water going over the spillway at Cedar Falls, in addition to the supply of peak and off-peak current. Councilman William Hickman Moore estimates the amount of waste totals at least 25,000,000 kilowatt-hours a year.

Stations to Study Stream Flow of Colorado River

The necessity of accurate figures relative to the stream flow of the Colorado River before any serious consideration can be given to any of the major projects which have been proposed, not only for irrigation and power purposes but also for flood control, has caused the U. S. Geological Survey to establish twelve base gaging stations, six on the main river and six on the tributaries. In addition to these base stations secondary stations will later be established for the solution of special problems.

The base stations on the main river are at Topock, Yuma, Boulder Canyon, Bright Angel, Lees Ferry and Cisco. The stations on the tributary streams are on the Green, San Juan, Little Colorado, Virgin, Williams and Gila.

The city council of Seattle plans to build in Seattle, or near that city, the 200 new light-weight street cars proposed for the municipal railway lines, to replace the present heavy cars in use. The car construction will involve an expenditure of \$3,000,000, and the council plans to construct at a local plant everything but the motor equipment, which will be purchased in the East. A formal offer has been submitted by the Pacific Car and Foundry Company of Renton to construct the cars at cost, plus 10%, and the city utilities committee is considering this offer.

New Line Extension Rules in Effect in Oregon

Public Service Commission Issues Orders Governing Extensions in Urban Districts to Bring About Uniform Policy

An order governing line extensions in urban districts has been issued by the Public Service Commission of Oregon, in order that there will be a uniform policy governing line extensions by all electric utilities in the state. Urban extensions are defined by the commission as including all additions to distribution systems built primarily to serve consumers located within the corporate limits of cities or villages or other territory which has a character and density of population generally similar to urban conditions. The cost of construction, the ruling states, shall include all labor, material, and other expense for the distribution and installation of poles, wire, cross-arms, insulators, line hardware, excluding services.

The report holds that services, meters and transformers and the cost of the installation thereof shall be supplied by the utility and cost of same shall not be included in the "actual construction cost." If it is necessary to over-build existing secondary lines with primary lines or to increase present capacity of either primary or secondary circuits leading up to the new construction, such additional cost shall not be considered as a cost of extension and shall be borne by the utility. The utility shall finance and construct any extension requiring one span of wires at standard spacing for each individual applicant and where more than one span is required the utility shall spend not less than \$60.00 per individual applicant.

If an extension above the free limit is required, the utility will be required to finance and construct the entire extension, and for that portion of the cost of the extension above the free limit, may require the consumer or group of consumers to pay, in advance, an amount which will produce, in the form of an annuity, a sum sufficient to provide the carrying charges upon the additional investment during the development period. The annuity shall be computed at an interest rate of not less than 6 per cent. The carrying charges consist of maintenance, depreciation, taxes and return. The maintenance, depreciation and taxes shall be based on the actual operating costs as charged by the utility on similar construction. The percentage of return shall be equivalent to that obtained from the utility property as a whole. Such excess extension shall be considered to have a mean effective development period of five years.

If conditions make it doubtful whether the business derived from an extension and the utility and the prospective consumer or consumers are unable to adjust the basis upon which the extension will be made, the matter may be submitted to the Commission for investigation and determination as to the reasonableness of such extension. This shall not be construed as permitting the utility to allow additional applicants to be attached to any extension within the period of three years without such additional applicants first paying the consumer or consumers therefor making advance payments on ac-

count of excess cost of the extension, a pro rata share of such advance payments, or obtaining a written waiver in lieu thereof.

The order further provides that an extension must be constructed at actual cost, and that if the actual cost is less than the estimated cost a pro rata refund must be made, or if the actual cost exceeds the estimated cost the utility shall have the right to collect the additional cost pro rata from the consumer or consumers served by the extension. All equipment installed by the utility shall remain its sole property.

This ruling is the outcome of a desire on the part of the Commission and the utilities of the state to have formulated a standard and uniform set of rules to govern line extensions, and while it is not clear in some respects, it will no doubt prove far better than the method of each utility to a large extent making its own line extension policy, which was the practice before this order was handed down.

State Commission Issues Drastic Order in L. A. Telephone Case

An order believed to be unprecedented in its drastic features has been issued by the California State Railroad Commission in conjunction with the Los Angeles telephone situation. The order, which is directed to the Pacific Telephone and Telegraph Company, briefly requires that the company make refunds for lapsed service under the schedule for which the entire month's telephone bill is refunded if the service failure exceeds fourteen days; that the company complete construction and give normal service in certain districts within a specified time limit and that George E. MacFarland, president of the parent company, proceed to Los Angeles and remain in charge of the entire program until further order of the commission.

No changes were made in the rate schedule set last December, although the rehearing of the case had been asked by Los Angeles and Pasadena for this purpose.

During the hearing it developed that at the end of February the company had a total of 12,000 delayed installations for the Los Angeles exchanges alone. The increase in the number of orders estimated for 1922 was placed at 35,000 as well as 25,000 other orders for number changes.

The failure on the part of the telephone company to maintain adequate service is blamed upon the enormous growth of the southern California metropolis during the past few years.

Complete rejection of the proposal to bridge Lake Washington by means of utilizing fifteen wooden hulls from shipping board craft moored in Lake Union, has been announced by the King County Commissioner. Construction of roads at a cost of \$575,000 would be necessary to open the bridge for travel, declared the commissioners. The annual upkeep would be \$50,000 a year, and the life of the bridge a doubtful question, they state.

McGraw-Hill Co. Buys Mining and Scientific Press

Mining and Scientific Press, a technical publication published for the past sixty-two years in San Francisco, has been purchased by the McGraw-Hill Company, Inc., of New York and will be consolidated with the Engineering and Mining Journal, the new weekly to be known as the Engineering and Mining Journal-Press. The Journal-Press will be published in New York. In order to give western mining men a strictly sectional service, there will be published in San Francisco a monthly supplement to the Journal-Press to be known as the Pacific Mining News, which will be distributed in conjunction with the New York publication to subscribers in the western district. The addition to the technical fold of the McGraw-Hill publications is the fourteenth to be issued by this company.

Philadelphia Concern Purchases Pelton Water Wheel Co.

The plant and interests of the Pelton Water Wheel Company of San Francisco and New York, manufacturers of high head impulse water wheels, have been purchased by the William Cramp and Sons Ship and Engine Building Company of Philadelphia. The purchase of the San Francisco concern has resulted in one of the largest mergers of manufacturers of hydraulic equipment in the history of hydroelectric development, as the Cramp interests already control the I. P. Morris hydraulic turbine interests.

The Pelton Water Wheel Company will continue under the old corporate name and will become a department of the Cramp interests. H. B. Taylor, vice-president of the William Cramp and Sons Ship and Engine Building Corporation, will be president of the Pelton Company; Ely C. Hutchinson, formerly chief engineer of the San Francisco company, will be vice-president and general manager and William M. Moody will be second vice-president.

In a statement announcing the sale Mr. Hutchinson says:

"Under the new arrangement, the facilities and experience of The William Cramp and Sons Ship and Engine Building Company combined with Pelton will be available, and will enable them to continue to a greater extent than ever before the policy of maximum Pelton service to the power companies and users of Pelton apparatus both here and abroad."

Los Angeles Buys Power Company Distribution System

The California State Railroad Commission has been asked to approve the final agreement between the Southern California Edison Company and the city of Los Angeles whereby the municipality takes over the distribution lines of the power company within the city limits for a consideration of \$11,000,000 plus the cost of extensions and betterments made since May 26, 1919, when the agreement was formulated. Litigation in the courts over the issuance and sale of bonds covering the purchase price has held up the taking over of the system until the present time.

The agreement provides for the preferred purchase and sale of power between the parties concerned, and while the power company retires from the city, the latter agrees to protect the Edison Company from competition out-

side the city limits. Power will be purchased and sold at rates set by the Railroad Commission.

The Southern California Edison Company has issued the following statement regarding the sale:

"That the city of Los Angeles has constructed and owns certain hydroelectric generating plants as a part of its Owens River aqueduct system; that said city through its charter has been and is committed to the policy of retail distribution of the electric energy produced by its generating plants; that at the time the purchase agreement was entered into, the city had constructed certain distributing lines within the city, and was proposing to construct a complete system to serve the entire city at retail, paralleling the company's lines, unless the city could acquire the company's power system for distribution purposes; that the purchase agreement was negotiated through the informal offices of the Railroad Commission as a settlement of existing and threatened future controversy between the city and the company over said matter; that under the terms of said settlement as expressed in the purchase agreement, the company is to retire from the retail field within the city, and is to have the exclusive right and assumes the duty of supplying to the city at wholesale such amounts of electric energy as the city shall need in excess of the production of its own plants, while the city is to protect the company against competition by the city in territory outside the city limits, by giving the company the first right to purchase any surplus energy the city may produce in excess of the amount required to supply its own uses, and to supply consumers within the city; that the consummation and observance of the settlement effected by the purchase agreement will avoid economic loss to the company which might result from competition with the city, both inside and outside the city limits, and is for the benefit of the public service."

S. F. Calls For Bids on Hetch-Hetchy Project Plant

Recommendation was made to the board of public works recently by City Engineer O'Shaughnessy that bids be advertised for the installation of equipment in the Moccasin creek power plant of the Hetch-Hetchy project in Tuolumne county. The contract, which is the largest to be let so far on the project, involves approximately \$1,000,000, and will be opened to bidders April 12.

The Moccasin creek plant will be the first of several large hydroelectric power installations, which will utilize the water flowing into the Hetch-Hetchy aqueduct, about forty miles from Oakdale. It is expected that the equipment contracts will be passed on by the end of April and that work of installation will be finished within a few months.

The contracts call for the erection of four of the largest electric generators ever utilized in this section of the country; four impulse water wheels capable of 240 revolutions per minute and of generating 25,000 horsepower per unit; and of eight thirty-six-inch valves.

The Moccasin creek hydroelectric unit is to be an adjunct to the Hetch-Hetchy water supply system, which is to ultimately supply 400 million gallons of water to the San Francisco metropolitan district. The source of supply will be the upper portion of the Tuolumne river watershed within Yosemite National Park.

The McGraw-Hill Industrial Letter, a 12-page bulletin issued monthly as a special service to advertising agencies, inaugurated in January, 1921, is to be mailed in the future to all subscribers to Crain's Market Data Book, as well as to sales and advertising executives in the various industries, who desire this service.

Books and Bulletins

PROTECTIVE RELAYS

By VICTOR H. TODD, designing and manufacturing engineer, Westinghouse Electric and Manufacturing Company. 8¼ by 6 inches. 274 pages. 244 charts, diagrams and illustrations. McGraw-Hill Book Company, New York.

The need of a text book on the theory and application of relays for the protection of station and generating station apparatus and distribution and transmission lines has long been felt by those engaged in the engineering design and application of protective relay systems. With the large growth in power capacity of transmission systems, the use of the most carefully worked out designs of protective relay systems has become imperative. In his book Mr. Todd has made the first attempt to cover this subject from the first principles of protective relays to the protection of high tension, interconnected networks, the object being to make the work of value not only to the operator and tester who have a fair knowledge of electricity and are seeking more information, but also to the designers of the systems who may find many points not previously taken into consideration in calculation.

A more thorough establishment of the fundamentals upon which protective relay systems must be based could have been included in the work with marked advantage. The installation of protective relays must be made upon logical lines which are fundamentally sound, and an exposition of these fundamentals would have done much to clarify the situation.

Although the book admirably catalogs the protective relays on the market and presents many arguments in favor of their use, but little actual data from practical installations is given. Descriptions of particular installations giving the exact settings of all of the relays, the timing, the actual current from tests of short circuits, and even such details as the sizes of wires used in the connections and their lengths would be of material value to engineers actively engaged in protective engineering.

G. E. ARMSTRONG.

Pacific Coast Editor,
Electrical World.

The Engineering Foundation has published a report of the seventh year of its activities in research connected with the various phases of engineering. The book will also contain an abridged report of the extensive investigation of the fatigue phenomena of metals, carried on by the engineering department of the University of Illinois, made possible in a large measure by a large contribution from the foundation. Copies of the report may be received by addressing the Engineering Foundation, Engineering Societies Building, New York City.

The greatest per capita use of electricity of any city in the United States is claimed for Bend, Oregon, by the Bend Water Light and Power Company.

Meetings of Interest to Western Men

California Cooperative Campaign Announces 1922 Plans

Education of the public in the broader uses of electricity, first for domestic purposes and second, for industry, the education of the members of the electrical industry in the efficiency and broad uses of electrical heating, are the major purposes set down in the program of activities for the California Electrical Cooperative Campaign for 1922, as announced at the meeting of the advisory committee of the organization, held in San Francisco on February 24.

The public educational campaign will take the form of an intensive campaign among clubs, industrial and semi-technical organizations and schools and colleges. Industrial films, lectures and displays will be the chief method of spreading this information.

In educating the electrical industry in electrical heating, group meetings will be held in various parts of the state, including an "Electric Heating Day" before the Los Angeles Electric Club and the San Francisco Electrical Development League.

In its plan for closer cooperation with the contractor-dealer, the advisory committee will distribute copies of the revised wiring diagram for an electrical home to the contractors free of charge, provided they will assume the responsibility of distributing the charts to prospective builders. The wiring plans will also be placed in the hands of architects, building contractors and realtors by the campaign's field men. The campaign has also gotten out a convenience outlet display card which will be distributed in the same manner.

It was announced at the meeting that a bungalow type electrical home is now under construction in Oakland and will be ready for display during the middle of the summer.

The next meeting of the campaign will be held in Los Angeles, March 31 and April 1.

The Hydro-Electric League of Oregon has been organized as a successor to the Columbia Hydro-Electric League, according to announcement by George L. Cleaver, secretary. The Columbia Hydro-Electric League claims the distinction of having originated the 1925 exposition idea.

Civil Engineers to Hold Autumn Meeting in San Francisco

At a meeting of the Board of Directors of the American Society of Civil Engineers held in New York City recently, it was decided to hold the autumn meeting, not only of the Board of Direction, but of the entire Society, in San Francisco on October 18, 19 and 20, 1922. The meeting will be devoted to a Symposium on Water Power. After a two-day session devoted to technical papers and discussions, an excursion will be made to one of the power projects in the Sierra Nevada Mountains. San Francisco is represented on the directorate of the Society by Walter L. Huber, director for Northern California and Nevada; also by C. E. Grunsky, who was elected vice-president at the January meeting. George G. Anderson, director from Southern California, also offered much valuable cooperation in securing this meeting for San Francisco.

The Seattle branch of the Pacific States Electric Company on March 1 entertained as its guests members of the Seattle Electrical Association, who were addressed by J. D. Barnhill of Evans and Barnhill, Inc., San Francisco and New York, and D. E. Harris, vice-president and sales manager, Pacific States Electric Company, San Francisco. During the week of March 1, under the auspices of the Pacific States Electric Company, group meetings were held in Seattle to which were invited men of the electrical fraternity in that city.

At the regular monthly meeting of the Utah chapter of the American Institute of Electrical Engineers, held in Salt Lake on February 24th, an interesting address was delivered by C. C. Pratt, division chief of the Mountain States Telephone and Telegraph Company, on the subject of "Wireless on Wire Lines." Mr. Pratt discussed the carrier current system, which is used by the telephone company. Charts were used by the speaker to illustrate the points discussed. Following the lecture the members and visitors in attendance at the meeting went to the telephone plant, where they were taken on an inspection trip as the guests of Mr. Pratt.

University Extension Division Offers Electrical Course

The University of California Extension Division has announced the first of a series of nine successive courses of fifteen lessons each on "Direct and Alternating Current Electricity." The classes will be given on Tuesday and Friday evenings by Arthur L. Jordan at the San Francisco Polytechnic High School, beginning March 31. The courses will begin with the elements of the subject and carry the student through successive steps of instruction covering fundamental principles, numerical problems with the mathematics necessary for their solution, and experiments with practical machines. Those in the San Francisco district wishing to enroll are asked to apply at 140 Kearny street or at 264 Pacific Building.

Denver Contractor-Dealers Elect Officers

The Denver Association of Electrical Contractors and Dealers held its annual election of officers at its last monthly meeting, February 3. Clarence Keeler of the Denver Gas and Electric Light Company was elected president to succeed E. C. Headrick, who was recently made chairman of the Denver Electrical Cooperative League.

John Van Dyk of the Premier Electric Distributing Company was made vice-chairman, and R. S. Willoughby of the Silver State Electric Company was re-elected treasurer. It was announced that the standing committees would be appointed by the president some time during the month.

On March 3, the Seattle Electrical Association entertained as its guest Laurence Davis, a special representative of the National Electrical Contractors and Dealers' Association, at a meeting held at the Masonic Club. The meeting was attended by members of the Seattle Association, of the Seattle Builders' Association and of the Washington state chapter, American Institute of Architects. Dean Stephen I. Miller, Jr., of the faculty of the University of Washington, who is secretary-manager of the Northwest Electrical Service League, also delivered an address.

A budget requiring an expenditure of \$4,000 for the national convention of the American Association of Engineers, to be held in Salt Lake City June 5, 6 and 7, has been decided upon by the convention committee. The money has been appropriated and the different committees instructed to allow no delay in the preparations for the convention. The plans for entertainment include a course of education for the visitors to acquaint them with the scenery of Utah.

The establishment of an experimental fruit canning laboratory at the University of California under the direct supervision of the department of agriculture is urged in a resolution adopted by the Cannerymen's League of California at a recent annual meeting held in San Francisco. Experimental and research work which would be of immense value to the fruit canners could be done in such a laboratory, the resolution pointed out.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

OREGON ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Mid-winter Convention—Corvallis—March 30 and 31, 1922

K. E. Van Kuran, Los Angeles district manager for the Westinghouse Electric and Manufacturing Company, has been chosen to head the Los Angeles Electric Club throughout the coming year. One of the outstanding figures from the manufacturers' group of the electrical industry in the West, Mr. Van Kuran has been actively identified in every movement for the benefit of this industry. He was one of the pioneers in the organization of the Cal-



K. E. VAN KURAN

ifornia Electrical Cooperative League and is at the present time a member of the advisory committee of that organization. He has been actively engaged in the affairs of the N. E. L. A., and has taken a prominent part in the various departmental and district meetings held by Westinghouse executives in the West.

L. T. Merwin, general manager of the Northwestern Electric Company of Portland, is a recent San Francisco visitor.

Colonel H. M. Bylesby, head of the Bylesby power company interests, recently made an extensive inspection of the properties of the San Diego Consolidated Gas and Electric Company, one of the Bylesby subsidiaries.

F. R. Davis, of the advertising department of the General Electric Company, will shortly make an extended visit to the Pacific Coast for the purpose of investigating western market centers and of visiting the various offices of his company in this district.

Durbin Van Law, prominent ex-serviceman and electrical engineer of Denver, has been recommended by Senators Phipps and Nicholson of Colorado as manager of the U. S. Veterans' Bureau in the eleventh district comprising the states of Wyoming, Utah, New Mexico and Colorado. Mr. Van Law served as a captain of engineers in the army and has served as a consulting engineer since his discharge.

Carl Heintz, special merchandising representative for the Westinghouse Electric and Manufacturing Company in the West, is temporarily established at the San Francisco office of the company while engaged in special promotional work in this district.

John J. Cooper, general manager of the Mountain Electric Company of Denver, has been appointed on a committee to place a valuation on the lighting plant at Meeker, Colorado.

Personals

Dr. J. A. L. Waddell, American consulting engineer and world authority on bridge construction, has been awarded the Second Class Order of Merit of the Sacred Treasure, by the Emperor of Japan in recognition of his services in the promotion of engineering in the Nipponese empire. Forty years ago Dr. Waddell was an engineering professor in the Imperial University of Tokyo and rendered valuable service to Japan in connection with the founding of the engineering department of the university. This is the second decoration to be awarded to the American engineer by Japan.

Mitsuichi Ohshima, hydraulic engineer of the Shinyetsu Electric Power Company, Tokyo, has recently completed an extensive tour of practically every large hydroelectric project in California, preliminary to visiting eastern manufacturing centers in the interests of his company. His investigations into American hydroelectric development are being made preparatory to the undertaking a ten million dollar extension program which his company has planned with a view of increasing the power supply of the city of Tokyo.

Ronald T. Strong, formerly connected with the electrical industry in the West, has been appointed local representative for the Westinghouse Electric and Manufacturing Company at Hammond, Ind., where he is handling the interests of that company in the steel mills, the car building plants and other factories in the Calumet industrial district.

R. E. Fisher, manager of the commercial department of the Pacific Gas and Electric Company, has been appointed chairman of the committee of the San Francisco Electrical Development League which will represent the organization before the San Francisco Chamber of Commerce. Other members of the committee are E. O. Shreve, local manager of the General Electric Company, Robert Sibley, editor of the Journal of Electricity and Western Industry, T. D. MacMullen, secretary and sales manager of the Majestic Electric Development Company, C. L. Chamblin, general manager of the California Electrical Construction Company, and R. A. Balzari, president of the League and industrial manager of the San Francisco office of the Westinghouse Electric and Manufacturing Company.

S. L. Case, of the engineering department, Westinghouse Electric and Manufacturing Company, has been spending some time in southern California studying the conditions under which the proposed 220,000-volt lines will operate. As insulator specialist for his company, Mr. Case looks forward to the operation of still higher potentials in long distance transmission work with the assurance that most of the flash-over troubles have been eliminated and the limit in voltages is still undetermined.

J. L. Kendall, of Pittsburg, one of the owners of the Douglas County Light and Water Company, recently made an inspection of the company's holdings in Roseburg, Oregon.

Harry Chandler, publisher of the Los Angeles Times, has been chosen as the most useful citizen in the southern California metropolis by the citizens' committee of the Realty Board, which for the past few years has made such a selection. It will be remembered that Mr. Chandler's activities as a "Builder of the West" were recently set forth in the Journal of Electricity and Western Industry.

Arthur Kempston, field representative for the California Electrical Cooperative Campaign, has resigned from that position to become San Francisco industrial sales representative for the Electric Railway and Manufacturers' Supply Company. Mr. Kempston has been connected with the Campaign since September, 1921, handling the territory in the San Joaquin and Sacramento valleys between Chico and Bakersfield. During his connection with the cooperative movement he played an active part in bringing about a closer relationship between the various branches of the industry in the territory which he covered.

R. E. Caldwell, state engineer of Utah, and member from Utah of the Colorado River commission, addressed the weekly luncheon of the Utah Society of Engineers at the Newhouse hotel in Salt Lake City on February 27. Mr. Caldwell explained the reasons for the formation of the commission, detailed some of its problems and told what it hoped to accomplish.

Edward C. Portman, Jr., has been appointed manager of advertising service of the Journal of Electricity and Western Industry. He was formerly engaged in advertising and sales work in Chicago and Grand Rapids, Michigan, and recently resigned as San Francisco Supervisor of the U. S. Veterans' Bureau, where he was active in promoting the rehabilitation of disabled



E. C. PORTMAN, JR.

veterans of the World War. He is a graduate of the College of Commerce of the University of Wisconsin. During the World War he served as a first lieutenant in the field artillery. His work with the Journal of Electricity and Western Industry will consist in aiding advertisers in surveying western markets and in promoting campaigns, a distinct service afforded by this publication.

Henry Harnischfeger, president of Pawling and Harnischfeger, Milwaukee manufacturers of electrical material handling equipment, recently passed through the West en route to the Orient where he will visit the various branch offices of his company and allied companies. He will spend some time in Europe before returning to the United States. He was accompanied by Mrs. Harnischfeger.

Stephen I. Miller, Jr., secretary-manager of the Northwest Electrical Service League, and **W. D. Moriarity**, field service man of the same organization, addressed approximately thirty Seattle electrical jobber's salesmen at a lunch recently held under the auspices of the League.

P. C. Stone, formerly with the firm of Renard-Stary, Los Angeles, has joined the appliance sales department of the Illinois Electric Company. His friends on the Pacific Coast will remember him as one of the most aggressive sales representatives in the appliance business.

E. C. Headrick, one of the most prominent of the Denver electragists, has been elected chairman of the Advisory Committee of the Denver Electrical Cooperative League to succeed **T. O. Kennedy**, who recently resigned following his transfer to the Middle West. Mr. Headrick started his electrical career under the direct supervision of George Westinghouse in 1888 when he entered that great engineer's private laboratory. In 1900 he was sent to France as the special representative of the Westinghouse Company. Upon his return he accepted the post of assistant shop superintendent of the power apparatus department of the Western Electric Company in Chicago. He came to Denver in 1909 and opened a contractor-dealer establishment, specializing in the handling of motors and heavy duty equipment. For the past three years he has served as president



E. C. HEADRICK

of the Denver Association of Electrical Contractors and Dealers and was one of those instrumental in the organization of the Cooperative League. He takes charge of the activities of his organization at a period when it is launching its first Electrical Home and is planning to extend its scope to take in the entire state of Colorado together with portions of Wyoming, Arizona and New Mexico.

K. B. Miller of Mansfield, Ohio, one of the directors and stockholders of the Bend (Oregon) Water Light & Power Company, recently made an inspection of the company's properties in Eastern Oregon.

J. C. Thirwall, of the railway and traction engineering department of the General Electric Company, has been spending several weeks in the West gathering information on the probable future requirements of traction companies in the large western cities. The rapid growth of many sections of the West will necessitate the expenditure of large sums of money for the betterment of transportation facilities during the coming year.

J. B. Norcross of Denver has been appointed commercial manager of the mountain division of the Western Union Telegraph Company.

David P. Mason, forest engineer of Portland, is a recent San Francisco visitor. Mr. Mason is at present engaged in forest appraisal work for various large Pacific Coast lumber companies.

J. I. Colwell, Seattle district manager for the Western Electric Company, has been named a member of the executive committee of the Seattle Chamber of Commerce's industrial bureau for the year 1922, an example of the part being played by the men in the electrical industry in the industrial upbuilding of the West.

A. G. Dumbleton, Tacoma consulting engineer, has been chosen by the city to investigate several sites for a municipally owned power plant.

Captain Addison N. Clark, identified with the electrical industry in California for several years prior to 1919 and since that time, sales promotion manager for the Edison Phonograph, Ltd., on the Pacific Coast, has become affiliated with **Carl H. Heilbron** in the Southern Electrical Company of San Diego. It will be remembered that Captain Clark was assistant engineer in the electrification of the Southern Pacific Company's east bay suburban lines and was later resident engineer for the San Francisco, Napa and Calistoga Electric Railway. During the World War he was railway regulating engineer on the Verdun sector.

Guy W. Talbot, president, **L. A. McArthur**, general manager, and **H. H. Schoolfield**, chief engineer of the Pacific Power and Light Company of Portland, are recent San Francisco visitors. Their trip was concerned with central station business.

Clare N. Stannard, commercial manager of the Denver Gas and Electric Light Company, has been elected president of The Electrical Home Building Company as successor to **W. J. Barker**.

Irving B. Lincoln, until recently field service man and publicity director of the Northwest Electrical Service League working in the Oregon field with headquarters in Portland, is now identified with the Seattle offices of the League, in the Central Building. He replaces **R. G. Emerson** who was transferred to Portland.

F. F. McCammon, vice-chairman of the Denver Electrical Cooperative League and power sales engineer of the Denver Gas and Electric Light Company, is attending the N. E. L. A. Industrial Heating School at Mansfield, Ohio.

R. B. Walls, owner of the Peninsula Electric Company of Portland, has recently been elected chairman of the first district of the Oregon Association of Electrical Contractors and Dealers, which includes the city of Portland. He began his electrical career in 1901 when he entered the employ of the Pacific Telephone and Telegraph Company and when he left in 1917 to enter the World War as a first lieutenant in the Coast Artillery Corps, he was manager and



R. B. WALLS

wire chief at Tillamook, Oregon. Following the Armistice, he organized the Peninsula Electric Company and has been one of the most active figures in the affairs of the contractor-dealers. He is also actively identified with the Northwest Electrical Service League. His slogan is "100 per cent membership in the association by the end of 1922."

John Van Dyk and **John T. Hughes**, two Denver electrical men, are building new homes which will be small "model" electrical homes.

Obituary

Lyman A. Scovil, one of the foremost electrical engineers in the country, died at his home in Pasadena recently. He attained international fame when he designed and supervised the electrical installation at the World's Columbian Exposition in Chicago in 1893. He had been head of several Chicago manufacturing concerns and for many years was identified with electric railway construction in the Middle West. He retired from active participation in the electrical industry several years ago. His death will be mourned by the electrical industry of the entire nation.

G. Harold Powell, general manager of the California Fruit Growers' Exchange, died recently in Pasadena. He attained international fame during the World War as an organizer and executive for the Food Administration and has been known as one of the fathers of the cooperative marketing movement. He is credited with saying, "The basis of the cooperative movement is men. Capital can not cooperate; products can not cooperate; only men can cooperate." The industries of the entire nation will suffer from his loss.

The Central Electric Company has been opened in Denver by Ernest V. Beck, formerly connected with several large jobbing houses in that city.

The Bryant Electric Company, Bridgeport, Conn., is introducing to the trade a new appliance switch plug. The plug is designed to fit practically all makes of heating appliances and includes in its features a toggle switch mechanism and self adjusting springs to maintain a tight connection.

The Benjamin Electric Manufacturing Company, Chicago, has issued Bulletin No. 19 illustrating and describing Benox interchangeable wiring devices for suspending industrial and commercial lighting units. The bulletin is an unusual contribution to the art of commercial and industrial wiring.

The F. W. Wakefield Brass Company, Vermilion, Ohio, manufacturers of "Red Spot" lighting equipment, has placed on the market a decorated hanger which is designed to take any of the popular urn-shaped glassware. This hanger is made for either the suspension or ceiling types.

The Cutler-Hammer Manufacturing Company, Milwaukee, has announced the perfection of a new type of electrically operated bulletin machine for the use of newspapers and such agencies. The machine is remotely controlled by a standard typewriter keyboard and prints the bulletins at the rate of one word per second.

The Electric Materials Company has just secured the services of E. R. Kauffman who will have complete charge of selling Bates Expanded Steel Poles, throughout the western territory covered by the company. Mr. Kauffman has specialized for a number of years in the engineering problems incident to the manufacture and installation of Bates poles and has only recently returned from Japan, where he spent a year supervising the construction of transmission lines using this material.

Hendrie and Bolthoff, one of the largest Denver jobbers, in its monthly "Bulletin" for March, a house organ which is distributed throughout the Rocky Mountain region, devoted an entire page to the Electrical Home which will shortly be opened for display in Denver by the Electrical Cooperative League of that city.

The Economee Rheostatic Switch Company, Philadelphia, has issued a circular describing the new type rheostatic switches which have recently been perfected. The switch is adaptable to either lighting or power circuits and applies the current gradually by means of an automatically controlled timing device which can only be changed by adjustment. Sudden applications of current are eliminated as a result and the life of the lamps or motor extended.

The Golden State Electric Company, Los Angeles, moved into the new quarters at 826 So. Flower Street and celebrated the opening with a reception and special entertainment on February 15. The show rooms on the first floor are among the most attractive in the entire city. Executive offices are on the second floor. This progressive firm is now able to handle a much greater volume of business to better advantage as the new building provides accommodations for three times as much sales space as the former location.

Manufacturer, Dealer, and Jobber Activities

James S. Cowen has reorganized the Kyle Electric Company at 226 No. Union Avenue, Pueblo, Colo.

C. J. Hayworth has opened a contractor-dealer establishment on Main street at Eureka, Utah. He has announced that he will engage in all forms of contracting, the sale and repair of electrical appliances and auto ignition repairs.

L. A. Herdti and R. S. Folland have purchased the Ogden Electric Supply Company at Ogden, Utah. The store is one of the largest contractor-dealer establishments in Ogden and occupies two stories and the basement of the building at 2430 Washington street. Mr. Herdti has been elected president and general manager of the concern.

The Apex Electrical Distributing Company, Cleveland, announces that 130 salesmen for Apex cleaners and Rotarex washers and ironers won cash awards in the first lap of the annual Spring sales contest. The number of salesmen who competed was slightly over six hundred. The contest, which will have four laps in all, is now in the second lap.

The National Electric Service Corporation has been organized in Denver through the consolidation of a number of smaller concerns, including the Hull Signal Electric Company, the Selector Telephone Company and others. Preparations are being made for the construction of a factory for the manufacture of a number of standard electrical appliances. The incorporators of the new firm include Edwin Scorb, R. W. Taggart, Clay Munson, G. B. Suter and H. B. Seboldt.

The Wonder Electric Manufacturing Company has been organized in Portland, Oregon, and has taken over quarters at Twenty-fourth and York streets where it will engage in the manufacture of standard electric appliances including a commercial and domestic type waffle iron. John W. Henry is president of the new company. Its offices are located in the Chamber of Commerce Building.

Louis Ross, San Francisco civil engineer, has placed on the market the Ross Rapid Computer, adapted for office workers as well as engineers. It is an all-metal, circular computer, built like a transit and operates on the polyphase-duplex principle, but with simplified scales. The device is 5 inches in diameter, is provided with a desk clamp and magnifier and arranged to be carried in the pocket in a leather case. It is made and marketed by the Computer Manufacturing Company, 340 Sansome street, San Francisco.

C. E. Ingalls, manufacturers' representative of San Francisco, has recently completed an extended tour throughout eastern manufacturing centers. He has announced that he has been appointed district representative for the Philadelphia Electrical and Manufacturing Company and the Electric Power Equipment Company of Philadelphia. He has recently taken new offices in the Rialto Building.

The L and P Electric Company has been organized at Lamar, Colo., by H. B. Lee and G. C. Pyle.

C. W. McNeill and William Gaunt have established a contractor-dealer business to be known as the Liberty Electric Company at 322 No. Santa Fe Ave., Pueblo, Colo.

Magicoal Electric Fires, giving the effect of a living coal fire at the cost of operating a single electric lamp, has recently been added to the lines carried by the Electric Materials Company, San Francisco. Designed in Europe and used extensively in England and on the continent, the product has just been introduced into this country. The device can be installed in any coal grate or supplied already installed. It combines the comfort and cheerfulness of a coal fire, without any of the discomforts, with the cleanliness of electricity.

The Arrow Electric Company, Hartford, Conn., has designed a new type of fixture plug to be known as the convenience plug. One of its features is its unusual length which provides a solution to the problem of connecting an electrical appliance to a socket equipped with a glass shade.

M. C. Morrow, assistant sales manager of the Westinghouse Electric Products Company, Mansfield, Ohio, is visiting the various cities of the Pacific Coast investigating the market for his company's products on this coast.



WHAT HAS THIS GOT TO DO WITH THE PRICE OF LAMPS?

On the other hand if the truth were out, we would wager that the price of lamps is farthest from the minds of these earnest gentlemen. The tall jobber on the left—all jobbers should be tall and slender from the over-effects of golfing—is Charlie Listenwaller of Listenwaller and Gough, Los Angeles. His compatriot who is filling his pipe with that vile stuff which masquerades under the label of "The Durham Cow's Husband," is J. A. Vandegrift, sales manager of the National Lamp Works, Oakland. Pebble Beach was the setting for this little one act play.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Reports from the California Almond Growers' Exchange show that almond growers of California received approximately six million dollars of the \$362,600,000 estimated to have been received by the agriculturists of that state during 1921.

There has been a good rainfall throughout the northern part of the state and growing conditions in deciduous fruits are excellent. Grass has abundant growth and livestock is in good condition.

The bond and investment market has displayed continued strength and many new issues have been absorbed.

There has been little activity in residence building but commercial structures, repairs and alterations continue apace. The unemployment situation has abated somewhat due to demand for both skilled and unskilled labor in building operations.

Lumber demand has been reported active, sales being double those of last year.

LOS ANGELES

Bank clearings as reported weekly, continue to show increases over last year for corresponding periods. These increases vary from two per cent to fifteen per cent. Activity in city and county construction projects will materially assist in maintaining the large volume of business now reflected in bank reports.

Curtailment of operation budgets and construction plans for the fruit growers' exchanges, is noticeable as an aftermath of the freezing weather in January. The proposed line of refrigerated ships for the California Fruit Growers' Exchange has been indefinitely postponed because of the losses which the growers have suffered recently. Public building improvements are also held up for the present in some of the centers of citrus fruit production.

The formalities of transferring the distribution system of the Southern California Edison Company to the City of Los Angeles took place March 1st.

Building permits for the month of February are far in excess of the same month last year.

PORTLAND

Although there has been little change in the general business situation in the past two weeks, business men are very sanguine about the industrial and business outlook. There is a better tone all around and a feeling that from now on industry and trade will improve. In the wheat growing districts of eastern Oregon the condition of winter wheat was never better because of the abundance of moisture which has soaked into the

ground. Prices are firmer and many believe that this year's crop will bring \$1.50 a bushel.

Lumber production is approaching normal and there are splendid prospects of the railroads placing large orders with the mills of Oregon and Washington.

Electrical retailing and jobbing business is good and is much better than was anticipated. Owing to the activity in building, contracting and fixture business is good.

SEATTLE

Due primarily to approximately two weeks of unexcelled spring-like weather, a generally improved condition along practically every line of industrial and business endeavor is noted in Seattle and other Puget Sound cities.

During the month of February, 115 permits for new residences valued at \$332,445 were issued in Seattle. The aggregate value of building operations and repairs authorized by the building department during the month was \$611,635, bringing the total value for the first two months of the year to approximately \$2,500,000.

At the present time, more mills are resuming operation, and lumber production continues to increase, with sales and shipments keeping pace, or showing even more pronounced gains.

The peak of unemployment has passed. During February, a large number of the unemployed in the Puget Sound district were absorbed and this improvement is certain to increase with the opening of spring activities.

SPOKANE

Farmers generally, while impatient to get at their spring work, are cheerful over weather conditions as promising abundant moisture later on, particularly in irrigated districts, and also because in many localities it is a matter of tradition that good crops have followed long winters with much snow. Power companies are also pleased with the prospect of abundant water supply. Farmers, cattlemen and sheepmen are in a much happier frame of mind than several months ago owing to rise in the prices of their commodities.

Farm improvements in the way of new buildings, painting and remodeling are expected to reach large proportions in the aggregate. It has been estimated that more than 8,000 electric lights will be installed in the farm houses of Washington, Idaho and Oregon this year, based upon the replies to a questionnaire sent out by a leading farm magazine.

The lumber business has not picked up as much as had been hoped the first of the year. The cold weather, while ideal for logging, retards the opening of some sawmills. Building operations

which in Spokane bid fair in the matter of house construction, to far eclipse last year's excellent record, are being held up by the continued cold.

SALT LAKE CITY

While the business outlook is somewhat affected by a feeling of uncertainty as to the resumption of operations in some of the copper mining districts, there is a feeling of hopefulness that the coming of spring will bring a revival of activity by the copper properties at Bingham, Utah, and a consequent stimulus to business in general in the intermountain district.

A large amount of building is planned for the near future, and as soon as weather conditions permit this work will be under way. Many new homes will be under construction this spring.

The unemployment situation is somewhat improved, although this is still a very serious problem. The coming of spring weather will, however, furnish considerable relief.

Prices of farm products have increased materially during the past sixty days. This presents a more favorable situation in the agricultural districts.

Retail trade, in general, is fair. Electrical appliance sales in March in Salt Lake City will undoubtedly reflect some satisfactory figures, due to intensive campaigns which are being conducted, the most noteworthy of which is the washing machine campaign which is being put on by the Utah Power and Light Company.

DENVER

Cold weather early in March emphasized the unemployment problem. It developed many cases of need which will be cared for by the charities of that city until building and industrial developments are sufficient to absorb the over-supply of unskilled labor.

New building is requiring more craftsmen than in several years past. Building permits for February were greater than any time for a similar month in the past ten years. Small dwellings are being built to such an extent in new sections of the city that the real estate market for improved property of that type has dropped over ten per cent in the past four months.

Conservatism still exists in the purchase of nearly all commodities. House wiring supplies are more in demand than either small heating or heavy duty appliances. Dealers' stocks are low and jobbers are not anticipating many large orders. Both dealers and jobbers are more careful in the extension of credit because of the unusually slow collections.

It is generally believed here that a marked beneficial reaction will not be felt for at least another sixty days.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

JEFFERSON, ORE.—A measure for better water and lighting conditions in this place carried at a recent election.

ANCHORAGE, ALASKA.—J. A. Magil announces that he is planning to build a salmon cannery here at an early date.

WATERVILLE, WASH.—The Twigg Auto & Electric Supply Company has increased its capital stock from \$2500 to \$10,000.

BELLINGHAM, WASH.—The Hansen Electric Company has been incorporated for \$15,000 by Hans Hansen and Elija Hansen.

WALLA WALLA, WASH.—The city of Walla Walla plans to make improvements to its water system at a cost of about half a million dollars.

SEASIDE, ORE.—Construction of a sawmill and box factory at Elk Creek, near Ecola, will be begun soon, according to report.

TACOMA, WASH.—The contract for sinking test holes at the Lake Cushman dam site of the city of Tacoma's new hydroelectric project has been let to Lynch Bros., of Seattle.

SPOKANE, WASH.—Work on the new \$100,000 packing plant will start at an early date, according to announcement made by Adam Brown. Work has been delayed owing to bad weather.

SOUTH BEND, WASH.—The Kleeb Mill, burned several years ago, is to be rebuilt immediately by J. W. Kleeb, A. J. Cole and C. A. Doty. Plant will be one of the largest on Willapa Harbor.

BAKER, ORE.—The Commercial Creamery Company, P. A. Goodhugh, manager, will erect a new milk condensery in Baker, according to report. The building and equipment will cost about \$50,000.

ASTORIA, ORE.—A \$150,000 water front site has been purchased by the Armstrong Tool Company, of Chicago, and a factory will be erected within the next few months, according to announcement.

CHEHALIS, WASH.—The sale of a large tract of timber on Rainy Creek in eastern Lewis county, and the erection of a mill at the mouth of the creek has been announced by the Milwaukee Land Company.

SHELTON, WASH.—The Peninsular Railway Company, according to report, has announced that it will erect machine shops which will be equipped with new machinery, etc., at a cost of approximately \$100,000.

CLARKSTON, WASH.—Plans have been launched for constructing a dam across the Snake River at the mouth of Dry Gulch, to cost approximately \$400,000. The dam will be used as a storage lake for timber.

SALEM, ORE.—The Niterday Signal Co. has been incorporated with a capital stock of \$25,000 by A. C. Shute, W. V. Bergen, Edna May Finn, Hillsboro. The firm will deal in highway, railroad and other signal devices.

SEATTLE, WASH.—The city council of Seattle has accepted a bid for the remainder of a 1919 issue of \$1,755,000 light department extension bonds. The money will be used to complete the Cedar River power project.

EVERETT, WASH.—The Kiwanis Club is planning for the construction of a building at Aldercrest where convalescent patients may engage in vocational work. Plans have been submitted by B. F. Turnbull, architect.

CHEHALIS, WASH.—The contract for a new steel bridge over the Chehalis River at Klaber has been awarded to Davis, Bigelow and Stratton of Seattle. It will be a 160-ft. steel span with concrete abutments and 18-ft. roadway.

OLYMPIA, WASH.—The Rainier Electric Bake Oven & Equipment Company, Seattle, has filed articles of incorporation with a capital stock, \$15,000. Incorporators are Jacob Hieb, Peter Hieb, H. W. Stanislawski and Knut Halseh.

PUYALLUP, WASH.—Proposals for a power site at McMillan Falls, near here, have been made by the city council. The city has been advised by an engineer that ample power for the needs of the city can be derived at a cost of about \$50,000.

PORTLAND, ORE.—A \$200,000 furnace for manufacturing pig iron will be started within the next six weeks upon its property near Scappoose by the Oregon Charcoal Iron Co., according to announcement recently made by A. W. Martin, head of the concern.

COQUILLE, ORE.—The Mountain States Power Company is preparing to expend \$40,000 in extending and improving its light and power service in Coquille and the adjacent territory this spring, according to report. Material has already been ordered and work will begin at once.

McMINNVILLE, ORE.—A permit has been granted to the city of McMinnville to construct a storage reservoir on the Nestucca river, tunnel, canals and power house for the development of 5807 hp. on Walker creek for municipal purposes. The estimated cost of the project is \$350,000.

MEDFORD, ORE.—Announcement has been made by J. C. Thompson, of the California Oregon Power Co., in charge of the extension work of that company's lines, that the cost of constructing the power line from the station at Prospect to the plant at Springfield is \$6,000 per mile, the total cost of the project being estimated at approximately \$750,000.

EUGENE, ORE.—Officials of the California Oregon Power Company are busy securing the necessary rights-of-way, franchises, etc., preparatory to starting construction work on its new 120-mile, 110-kv. transmission line from the hydroelectric plant on the Rogue River to Eugene, where a tie-in will be made with the Mountain States Power Company's system.

PORTLAND, ORE.—The construction of a factory in Portland for the extraction of turpentine, rosin and by-products from Douglas fir pitch is soon to be started by a corporation formed by W. H. Curtis and L. R. Russe, two Portland engineers, and H. H. Ward, one of the organizers of the Portland Vegetable Oil Mills Company. The initial capitalization has been placed at \$100,000.

COEUR D'ALENE, IDA.—Officers of the Idaho Clays, Inc., have announced that they have formulated plans for the erection of a factory here which will cost approximately \$500,000. A number of buildings will be built including a power plant, where steam will be generated for the operation of the factory. Clay products of all kinds will be manufactured from clay obtained in the vicinity.

BAKER, ORE.—The Eastern Oregon Light & Power Company, J. P. Lottridge, vice-president and general manager, has outlined an extensive maintenance and construction program, to cost \$108,000, which includes tentative plans for ex-

penditure in Baker and vicinity, plant, towns and lines in Baker division, improvements in plants and lines in LaGrande and vicinity. Work will be started at once, according to Mr. Lottridge.

CANBY, ORE.—A bond issue of \$10,000 was approved by the voters of the town of Canby at a recent special election, for the purpose of acquiring or installing an election distribution system in the town. It is reported that the town expects to purchase the distribution system of the Molalla Electric Company, which now serves the city, for the valuation placed upon it by the Public Service Commission, or install a new system. It is stated that the Portland Railway Light & Power Co. will be asked to provide service. This action is said to have been brought on by dissatisfaction over an increase in rates granted the Molalla Electric Company by the Public Service Commission last July.

THE PACIFIC CENTRAL DISTRICT

FRESNO, CAL.—W. P. Fuller Company, one of the largest glass and paint companies in the West, is planning the construction of a \$95,000 warehouse here.

PALO ALTO, CAL.—Frank E. and J. D. Woodward have purchased the northeast corner of Hamilton and High street, where an ice and cold storage plant will be built.

SAN FRANCISCO, CAL.—The Collins-Hencke Candy Co. has purchased a lot on Folsom street, near Second, where a three-story and basement reinforced concrete factory building will be constructed.

SAN JOSE, CAL.—Contract for the construction of the first unit of the Coast Fruit factory to be erected at 319 South 24th street, has been awarded to A. J. Beilson. H. L. Hulburt is president of the Coast Fruit Company.

RICHMOND, CAL.—Charles A. Miller, superintendent of the Calena Signal Oil Refinery at Franklin, Pa., has been making preliminary arrangements here for the erection of a new half-million dollar refinery for his company.

FRESNO, CAL.—Joseph F. Ryan, of Elgin, Ill., who recently completed the purchase of the Dairy Products Company plant at Tranquility, announces that the plant will be enlarged to double its present size, where it is planned to manufacture pure cream that will last for months. Machinery to equip the plant has been ordered.

EL CERRITO, CAL.—Barrett & Hilp, 918 Harrison St., San Francisco, have been awarded a contract by the Great Western Power Co., 14 Sansome St., San Francisco, to erect a two-story reinforced concrete and steel substation here. The approximate cost of plant is \$125,000. Contract for the steel has been awarded to Pacific Rolling Mills, San Francisco.

SAN FRANCISCO, CAL.—Final drawings for the Horace Mann school, which have been approved by the Board of Education, provide for construction at a cost of \$400,000, according to revised estimates. The plan is divided by the architect, John Reid, Jr., into four groups—the main, or academic building of three stories; the auditorium, the gymnasium and the shop group.

SAN FRANCISCO, CAL.—Bids will be received up to 3 p.m., April 12, by the Board of Public Works, San Francisco, under contract

No. 180 Hetch-Hetchy water supply project, for furnishing and delivering electric generators and accessory equipment for the Moccasin Creek power plant. Plans may be secured from M. M. O'Shaughnessy, city engineer, City Hall.

THE PACIFIC SOUTHWEST

EL PASO, TEX.—The American Co. will erect a sugar mill in Sinaloa.

FULLERTON, CAL.—The Hydro-Carbon Co. will erect a factory here for treating natural gas to make gasoline and other products.

OXNARD, CAL.—School trustees are planning for the erection of a \$60,000 high school to be located between Simi and Santa Susana.

ALBUQUERQUE, New Mexico.—Jay J. Garfield has been awarded the contract for the erection of the Albuquerque Hotel for \$271,592.

LONG BEACH, CAL.—Bond experts from New York employed by the city council have declared the validity of the \$140,000 issue of water bonds.

LOS ANGELES, CAL.—The Highland Park Christian Church has awarded the contract for construction of a church building at West Ave., 58 and Monte Vista St.

LOS ANGELES, CAL.—The McCrea Construction Co. has been awarded contract for the erection of a factory for the American Aluminum Metal Products Co. at Burbank.

LONG BEACH, CAL.—Frank Thorn and W. M. Halliday will erect a theater on Windsor Place, east of Chestnut Place and west of Alley, to cost several hundred thousand dollars.

LOS ANGELES, CAL.—The Kay Bee Mfg. Co. will erect a two-story factory building on South Park Ave. near Jefferson St. for the manufacture of Kay Bee spotlights and Kay Bee stop signals.

SAN FERNANDO, CAL.—The International Chemical Products Co. will erect an ink factory at Maclay and Celis Sts. E. C. Fitz is president of the company, George W. Strang, general manager.

LOS ANGELES, CAL.—R. E. Miller, manager of the Owl Drug Company, purchased the property at the southwest corner of 9th and Hill, where he will build a 12-story, class "A" office building.

PHOENIX, ARIZ.—Construction has commenced on the additions to the refinery of the Rio Grande Oil Company. With the completion of buildings and tanks the improvements will total more than \$75,000.

COLTON, CAL.—O. L. Emery & Son will erect a factory at the corner of 6th and West H streets, which will be occupied by the Walker Candy Co., upon completion. The building will be of concrete construction.

LOS ANGELES, CAL.—Plans are being prepared by C. A. Truesdell, Jr., architect, for a part two and part three-story brick and reinforced concrete addition to the Bottling Plant of the Santa Monica Dairy Co.

SANTA ANA, CAL.—Members of the Villa Park Orchards Association are considering the erection of a packing house and installation of pre-cooling and pre-icing plants. Willard Smith is president of the company.

LOS ANGELES, CAL.—The contracts for the passenger elevators to be installed in the new 12-story office building for the Bank of Italy, were awarded to the Llewellyn Iron Works. The contract price is not announced.

SANTA BARBARA, CAL.—Samuel F. B. Morse, president of the company owning the Hotel Del Monte, recently completed a survey of a portion of the 2600-acre Hope Ranch near Santa Barbara as the site for a new hotel. The estimated cost of the building is placed at \$1,000,000.

BURBANK, CAL.—The American Aluminum-Metal Products Company has let the contract for a group of seven buildings to R. W. McCrea for the sum of \$88,000. Buildings to be of brick

with composition roof, metal sash and sky-lights.

LOS ANGELES, CAL.—Lynch-Cannon Engineering Company were the successful bidders on the brick and terra cotta office and freight terminal building for the Union Pacific Railway. \$210,000 is given as the contract sum.

PASADENA, CAL.—The Tournament of Roses Association has awarded the contract for the stadium to W. A. Taylor for a sum said to be \$300,000. The work will be done on a time and material scale. Seating capacity, 55,000.

LOS ANGELES, CAL.—F. O. Jean will erect a 100-room hotel and apartment on W. 7th St., according to plans now being prepared by architect W. E. Bowen and engineer W. E. Chadwick. The building will be five stories.

SAN BERNARDINO, CAL.—New buildings for the Santa Fe railroad shops are authorized in plans recently made public. Power house, incinerator, and lavatory buildings are included in the proposed expenditures of \$204,000.

LOS ANGELES, CAL.—A 4-story, Class A apartment house will be erected for George Marcell of New York City, according to plans which are announced by architect H. C. Deckbar. No estimate of the cost has been made public.

MONROVIA, CAL.—The Southern Counties Gas Company is to build a tile and cement office building at 114-20 E. Lemon street. The contract has been let to W. H. McCune of this city. The permit calls for \$15,400 estimated cost.

LONG BEACH, CAL.—Farmers and Merchants Bank has commissioned architect W. Horace Austin to prepare the plans for the new 6-story office and bank building to be located at Third and Pine Sts. Estimated cost \$800,000.

SAN PEDRO, CAL.—The city harbor commission of Los Angeles has called for bids to equip the new transit shed at piers 187-188 with automatic sprinkler systems. The bids will be for material as the city proposes to do the work.

LOS ANGELES HARBOR, CAL.—Llewellyn Iron Works was awarded the contract for erecting a steel transit shed at the harbor. The bid called for \$44,600 to complete a shed 100 ft. by 400 ft., with steel frame and iron roof and sides.

GLENDALE, CAL.—The San Fernando Boulevard Improvement Association has secured the signatures of a majority of the property owners between Brand Boulevard and the city limits, to a petition for an ornamental lighting system.

RIVERSIDE, CAL.—The Southern Sierras Power Company is clearing the ground on the Mill Creek site of its new power house. Construction work will start as soon as the weather permits. The location is above Forrest Home resort.

REDONDO, BEACH, CAL.—Property owners have arranged to buy the ocean front property of the Pacific Electric Company. It will be improved with ornamental lights and pier walkways to conform to the rest of the pleasure pier.

SAN PEDRO, CAL.—Los Angeles harbor commission will let contracts for the construction of an additional wharf and steel transit shed at piers 175-176 in the near future. Plans are being prepared by Engineer Vincent of the harbor board.

LOS ANGELES, CAL.—An 8-story loft building will be erected on Hill street near 7th for the Starr Piano Company. The structure is to be of steel frame construction with terra cotta facings. Estimated cost is given at \$250,000 including elevators.

KINGMAN, ARIZ.—The Santa Fe Ry. will expend \$6,000,000 in track improvements between Yampa and Griffiths, Ariz. Lloyd Harris is engineer in charge with headquarters in this city. A large part of the expenditure will be for double-tracking.

TUCSON, ARIZ.—Citizens are planning the erection of a canning and preserving plant in the near future. The following are directors:

C. E. Goyette, P. R. Lucas, J. S. Mann, W. T. Robie, W. B. Sparkman, C. B. Perkins and Bentley Winstanley.

LOS ANGELES, CAL.—The Southern California Telephone Co., K. R. Bradley Construction Co., contractor, will make additions and alterations to the building on the northeast corner of Donnor & Vernon streets, at a cost of approximately \$60,000.

LOS ANGELES, CAL.—Richard D. King, architect, has announced that construction work will start upon a two-story reinforced concrete building for the L. J. Christopher Co., contractor. The building will be used as an ice and refrigerating plant.

TUCSON, ARIZ.—The city council adopted resolutions to pave $3\frac{1}{2}$ miles of streets at a total expense of \$225,000. The work will commence at once if the weather permits. Plans and specifications by the city engineer will be made public in a few weeks.

SANTA ANA, CAL.—Birch Park is to be equipped with an ornamental lighting system if the plans of the city fathers are approved at a special bond election to be held during March. The cost will be \$10,000 including additions to the water system of the park.

HOLLYWOOD, CAL.—The Famous Players-Lasky Corporation will build the largest film laboratory in the West. Capacity of the laboratory is given as 1,500,000 feet of film per week. The structure is to be fireproof and the cost estimated at close to \$750,000.

LONG BEACH, CAL.—\$300,000 will be expended by the city in providing water facilities for the northwest section of the city. Electric pumping equipment and wells, together with the necessary piping are included in the plans as announced by city manager Hewes.

PHOENIX, ARIZ.—Twohy Bros. have been awarded the first contract on the United Verde Copper Co.'s new crushing plant at Clarksdale. The contract is for foundations only and the amount is \$150,000. The entire cost of the plant will be \$1,500,000 including machinery.

HOLLYWOOD, CAL.—Two new studio buildings are to be erected at once, the plans for the Cosmoart Picture Corporation are being prepared by J. E. Bowen and the Vitagraph Company has announced that the plans for its new stage are ready and the work will be done by day labor.

PHOENIX, ARIZ.—The contracts for highways which will be let during March will require more than 400,000 bbl. of cement, if concrete is selected from among the various types of paving bids to be received. 160 miles of paving is to be laid and \$4,500,000 is the lowest estimate among the engineers for the completed improvements.

COMPTON, CAL.—The Samson Tire & Rubber Co., organized in Los Angeles four years ago and erecting its first factory here, will make additions and extensions to the plant which will nearly double its floor space and nearly treble its producing capacity. The additional investment in the plant will be approximately \$200,000 and will include a new warehouse, electrical power room and generator equipment, extensions to mill room and tire buildings, construction of a new mixing mill line, as well as considerable new equipment.

LOS ANGELES, CAL.—A modern six-story and basement Class "A" store and office building is to be erected on the property at the northeast corner of Sixth and Western Streets, which was recently leased by E. R. Stroufe, owner, to F. L. Dickinson for a period of 99 years. Mr. Dickinson also plans to erect a theatre building on the property to seat 1200 people. Plans and specifications for both structures are being prepared by architects Walker and Eisen. It is expected that construction work will start about May 1st.



Salvage Blows the Fuse

Every dog has his day, according to the proverb—and the dog with a broken tail has a weak end. "Salvage," which in some sense has served as the canine pet of the editorial rooms, living on the left-overs from the weightier diet of a serious menu, alternately loved and kicked, has now come to its end. With this issue the department terminates in favor of the more pressing needs of the growing business service of the paper. The family has, so to speak, moved into the business district and there is no further room for the dog. It is with some regret that the editor of this page thus makes a graceful exit, thanking one and all for their kind attention—but, it must be confessed, it is with some relief as well. It is easier by far to preach a better sermon, write a better book, or build a better mousetrap, than to be funny and although the world, we feel, had started its beaten path to our door, we are contemplating allowing the grass to grow again over the footsteps. We are thinking of going into the mousetrap business.

* * *

This Is Too, Too, Too Much

In changing the telephone directory of a western city recently, zeros were prefixed where numbers have less than four numerals. Shortly after the system went into effect, a leading citizen had occasion to call for such a number, asking for "Main 4." The operator said it, "Main, oh, oh, oh, four"—and the leading citizen replied, "Oh, oh, oh, yes."

* * *

Try This on Your Corona

Having accidentally pressed down the wrong shift on the office infant, the following practical code for private correspondence between stenographers during office hours was discovered. To solve the code, reverse the process.

@ 29: 3417# ?*30

285* 330 43 03?5 8 9!! ;6 *35

59 80 28? 9 23# 0344

*3 6 5*35 *3 ?3: !3## 330

2*3: 8: @ 3308: _ ?34

* * *

The Modern Electrical Home

A quotation is sent us from the March number of Everybody's Magazine which suggests a new principle of operating electric appliances. The hero and heroine, apparently, were forced to move. However,

"They found an apartment on the West Side of New York, with plenty of sunshine for Cissy to run the electric sewing machine by."

At last, it seems, electric power has been harnessed from the sun!

Wireless Weather

Those who complain of the telephone service may be thankful that they do not live in Japan, where the weather bureau has recently found it necessary to install wireless apparatus owing to the fact that the weather moves faster than it is possible to get through telephone or telegraph connections.

* * *

ELECTRICAL HYBRIDS



XXIII — The Electric Hybridiot

The electric hybridiot writes all these rhymes
In hybridiomatic phrases

Which hybridiosyncrasy's one of her crimes—
Or a virtue, whichever the case is.

Both her head and her heart are uncommonly light,
Though on hats she's inclined to grow heated.
Her nose may be shiny, at least it is bright—
It depends on the way she is treated.

Her costume is shady—we point to the skirt—
Her feet, right and left, are both standard.
They say she is frivolous, light and a flirt—
As for me, I declare she is slandered.

Journal of Electricity and Western Industry

25 Cents a Copy

April 1, 1922

San Francisco



The Sustained
Accuracy
and Absolute
Dependability
of the
SANGAMO
Type H
Watthour
METER

assure
Justice alike
to Central Station
and to the Consumer

Sangamo Electric Company

Type H
Polyphase
Watthour
Meter



The tremendous increase in the importance and use of Radio communication, due to the perfection of instruments and the interest of the general public, is the direct cause of the construction of thousands of commercial and private wireless stations.



Macomb plastic process strain insulators for antenna and all insulation work insure apparatus that will function properly.

Carried in Stock at Three Pacific Coast Warehouses

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE



Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, APRIL 1, 1922

NUMBER 7

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1922, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

Printed in U. S. A.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Engineering News Record
American Machinist

Power
Chemical and Metallurgical Engineering
Coal Age

Engineering and Mining Journal-Press
Ingenieria Internacional
Bus Transportation

Electric Railway Journal
Electrical World

Electrical Merchandising

Journal of Electricity and Western Industry
(Published in San Francisco)

Electrical Review and Industrial Engineer
(Published in Chicago)

American Machinist—European Edition
(Published in London)

Pacific Mining News Supplement to
Engineering and Mining Journal-Press
(Published in San Francisco)

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

259

The Most Important Problem of Western Industry—Broadening the Co-operative Campaign Idea—The Coordination of Storage Reservoir Facilities—One Way to Retard Business Recovery—Locating an Industry in the West—The Rapid Rise of the Radio Telephone—Spending the Money Where It Will Help—The Common Sense Attitude Toward Earthquakes.

When the Buyer of Location Meets the Seller of Opportunity

267

By WILLIAM H. CRAWFORD

The factors underlying the location of an industrial plant and the obligation of the merchandiser of community advantages.

Costs of Electrical Energy in California Compared with Ontario

269

By ROBERT SIBLEY

A comparison of the rates of electric energy in the Province of Ontario, Canada, and in California are favorable to California.

California's Prosperity Depends on Future Supplies of Fuel

272

By C. H. DELANY

Industrial growth of California will depend upon her ability to secure adequate coal when present oil reserves are exhausted.

Federal Highway Appropriation Will Benefit Western States

275

Appropriations totaling \$15,000,000 will permit the development in National Forests of adequate road and trail facilities.

Western Comment on Current Events

262

Letters to the Editor

264

Radio Bulletins

265

Builders of the West—Edward F. Adams

266

Federal Road Funds Shared by National Forest States

276

Self Improvement in Salesmanship

277

Increasing Production in Industry

279

Western Dealer, Jobber and Agent

281

Activities of the West

284

Meetings of Interest to Western Men

289

Personals

290

Business Outlook in Western Market Centers

292

Manufacturer, Dealer and Jobber Activities

294

Construction News and New Industrial Developments

295

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of CALIFORNIA, Rialto Building, San Francisco

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

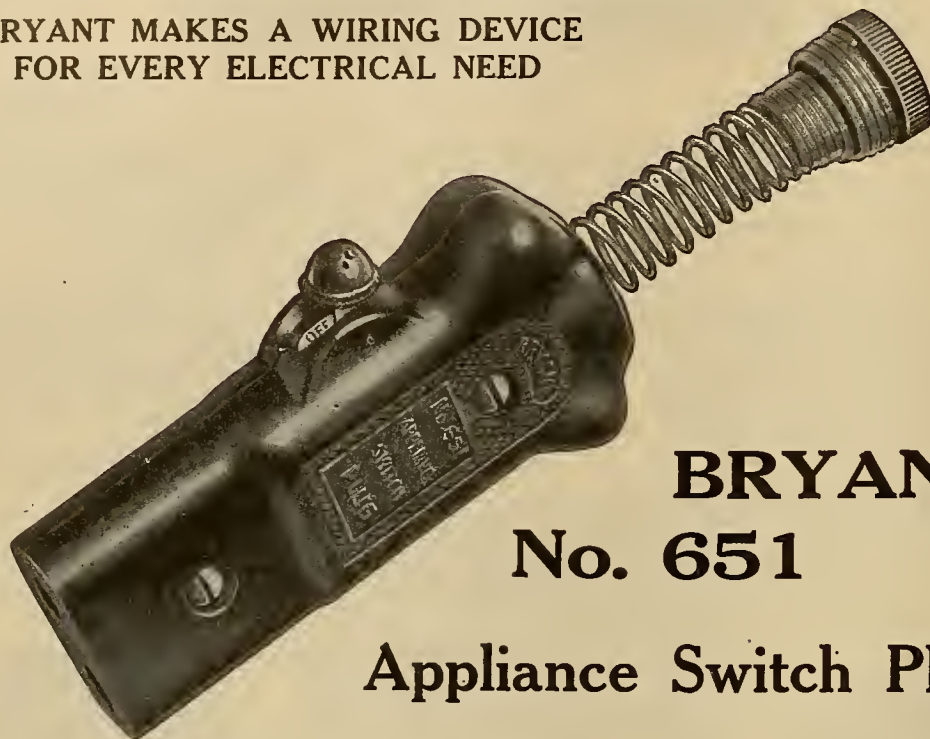
C. M. Lindsay
Sec'y-Treas.

JANKEE
SWITCHES



PERKINS
SWITCHES

**BRYANT MAKES A WIRING DEVICE
FOR EVERY ELECTRICAL NEED**



**BRYANT
No. 651**

Appliance Switch Plug

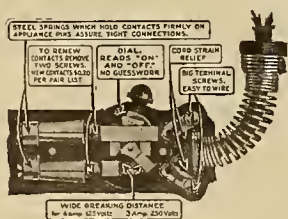
Bryant No. 651 fits most heating appliances and holds on tight. No loose connections with No. 651.

The husky toggle switch indicates clearly whether the current is on or off. The self-adjusting contacts can be renewed.

No. 651 is Bryant quality all the way through.

Every appliance user needs and will buy No. 651. The market is everywhere. To stimulate sales each ten are packed in a four-color counter display carton which when opened is ready for business.

No. 651 will be a big seller. Get in on it.



No. 651

List	\$0.80
Sched.	H2
Std. Pkge.	50
Carton	10



Immediate Shipment.

Order from your Distributor's stock.

THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK

CHICAGO

SAN FRANCISCO

D-D
RECEPTACLES



BRYANT-PERKINS

JUNIOR
RECEPTACLES

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 7

SAN FRANCISCO, APRIL 1, 1922

Per Copy, 25 Cents

The Most Important Problem of Western Industry

QUESTIONS of American valuation in the tariff, of the necessity of a sales tax or of the soldiers' bonus are all important to western industry—but in comparison with the problem of trans-Pacific relations, they are merely pleasant household controversies as against impending earthquake, flood and fire. Few people realize how serious the situation actually was at one time. California legislation and other western agitations, of course, had something to do with it—but there were questions of international relationships beyond this, based on the needs of an expanding population combined with the militaristic ideas of the right to a place in the sun.

Those who were in touch with the work of the disarmament conference at Washington felt with a great

breath of relief that these dangers had at last been met—and through open dealing and reasonable forbearance had actually been removed, or at least, placed in the category of those things which fade away for lack of interest.

This editorial is written while the Four Power Pact, as it has come to be called, is still under fire. By the time the paper reaches our readers, the treaty may already have been ratified. For the sake of the future of the Pacific, which means as well the future of western America, it is to be hoped that the Senate will approve the judgment of the recent conference.

With all elements of progress bordering the Pacific working together, there is no limit to the possibilities of this great market place of the future.

Broadening the Cooperative Campaign Idea

INTROSPECTION is a great thing in these days of readjustment and the time has come to take account of stock. Editorial pages by the dozen in this magazine have been devoted in recent years to the good effects of cooperative movements throughout the West, particularly using as an instance the great success of the California Electrical Cooperative Campaign. This Campaign, as the pioneer of electrical cooperative leagues, has instituted traditions that are far-reaching and that undoubtedly have accomplished a tremendous amount of good in the upbuilding of the electrical industry, not only locally but throughout the nation as a whole. Get-together meetings, better accounting, better window displays, cooperative advertising, electrical home campaigns and many other things that go toward the upbuilding of the industry have been promulgated and advanced through the efforts of this movement.

These efforts are still of the greatest importance and the Campaign is today undoubtedly the most important single factor in advancing the electrical industry in California. But times are changing. We find that the modern channels of electrical trade are broadening. It is doubtful, for instance, if in California at this time the merchandising of electrical ware through the contractor-dealer is as much as 50 per cent of the entire movement of electrical merchandise. Similarly, as was pointed out in

a recent editorial in these columns, the unconnected contractor who is without the pale of organized educational activity is today doing something like 75 per cent of the residence wiring in western cities. This means that contact with the public is very largely in the hands of men who are not receiving the benefits of cooperative educational movements, who are not concerned with telling the convenience outlet story, but who, on the other hand, are most anxious to sell any kind of material at any cost which will bring them the trade.

The contractor-dealer cannot deal with this problem alone. He cannot legally ask, nor would it be advisable if he could, that the manufacturer and wholesaler sell only to association members. He and the industry with him have tried the solution of making the association man a good merchant, on the theory that those outside the pale will soon annihilate themselves. This is good business sense, and undoubtedly has assisted in maintaining the importance of the contractor-dealer as a distributing channel, but the fact remains as indicated by the figures quoted above, that the principle of exclusion has failed.

There remains the possibility of taking these other agencies into the fold, impressing on them the principles of good business and leaving it to the processes of education to remove objectionable factors in competition. It is time to revitalize the cooperative movements of the electrical industry, to take

into consideration all those engaged in the merchandising of electrical ware, whether they be association contractor-dealers, non-association contractor-dealers, hardware men, druggists, department stores or central stations. Unless these cooperative campaigns can continue to grow with the problems of the electrical industry, meeting the need for education in electrical merchandising throughout all channels of distribution, they cannot hold their present high position of importance, nor will they deserve the tremendous influence and backing that they should receive under their broader conception of educational usefulness.

The Coordination of Storage Reservoir Facilities

WATER development on the Colorado River is a three-fold problem involving the storage of flood waters with the consequent prevention of disaster, the utilization of these storage waters for irrigation and the maximum development of power, consistent with both of these claims.

Not nearly so complicated is the problem of the proper coordination of storage reservoirs in the high mountains of the West on present day power systems with the storage reservoirs of some of our irrigation projects situated in the valleys below. Yet in this simpler relationship, the problem is still far from solution. More thought and study should be given to this coordination, notably in California. Here the irrigation projects are developing storage at low altitudes, many of them with power developments as an auxiliary function. The demand for water for irrigation is very seasonal, in some cases occurring in off-peak seasons and, in some instances, paralleling the heavy load demand of the power companies. The difficulty lies in the fact that with a large reservoir and a comparatively high dam with the plant located directly at the dam, as the water is drawn out the head decreases so rapidly that the power output toward the end of the season becomes low even though the draught of water is high. The result is a power plant which is but very little better than the ordinary stream flow and of very marked decreased value as an economic unit in the development of our power resources. It is to be hoped that all this discussion concerning the Colorado will lead engineers and executives concerned with the problem of the coordination of storage reservoirs to devote more time and study to the proper distribution of water duties with the best interests of the community in mind.

One Way to Retard Business Recovery

GOVERNMENT interference in the operation of an economic law does not hinder the operation of the law, it merely shifts the burden of the loss to someone else's shoulders, with the surprising results which are so familiar a phenomenon in a world of experimenting Congresses. With the business depression of the past two years, with the farmer suffering from low prices combined with the

high cost of living and clamoring for relief, Congress has spent most of its time casting about for the proper law to enact which would remedy the situation. In the meantime better crops, better prices and lower labor costs due to perfectly natural causes are fast remedying the difficulties.

It is admitted everywhere except in Washington that the continuance of high taxes is one of the primary obstacles to a revival of business activity. Congress, however, instead of devising ways of economizing in government expenditure, seems chiefly concerned with finding new sources of taxation for the purpose of doing something that does not need to be done and should not be done—namely, paying a bonus of cash to several million able-bodied young men who, in the course of fulfilling their duties of citizenship, spent time in uniform in the service of their country. The government is already spending \$400,000,000 in compensation, hospitalization and rehabilitation for the benefit of soldiers who suffered injury or ill health in service, and no one would begrudge a cent of this expenditure even if it were twice as great. But to endow with cash the much larger number who suffered no ill effects from their army experience would confer a doubtful benefit upon the recipients, place a further burden upon taxpayers and retard the restoration of prosperous business conditions.

Locating an Industry in the West

DISTANCE between two points is best measured by the straight line. To those who are interested in the development of western communities, the straightest line between the eastern manufacturer and the establishment of a western branch lies in a straightforward telling of the business facts of the situation. Wm. H. Crawford, manager of the Department of Industries of the Portland Chamber of Commerce, in his article on another page of this issue points out the proper function of the community promoter in this field.

Western Chambers of Commerce on the whole have recognized their opportunities in this service and with some few exceptions and occasional lapses into superlatives, have undertaken businesslike studies of the needs and resources of their communities. Today they are ready with facts and analyses to assist the manufacturer by supplying figures he could not otherwise obtain.

In business the present era is one of cleaner competition because goods today are sold on their merits alone. Good advertising recognizes the weakness of the exclamation point and the high pitched voice and the value of conservative facts. If it be true that no manufacturer can afford to sell his product to a man who does not get his money's worth from it, this is even more true of a community. What the West needs is the proper zoning of its development so that each district is growing and contributing to western prosperity according to the natural factors of its location and resources. Chambers of Commerce and business organizations are the

ones to make the studies which will bring about this coordinated movement—and it is a good sign for the West that so many of them are recognizing the importance of this function.

The Rapid Rise of the Radio Telephone

A QUESTION of great interest to all power companies, and indeed to industrial plants of all kinds which have separate plants and factories situated in various parts of a district, is that of adequate communication between these districts, plants and substations. Private telephone systems are expensive, commercial systems are subject to failure in time of storms and do not always extend into mountainous or desert regions where they are most needed. Hence, it is true that all central station operators, and indeed leaders of other industries throughout the West are awaiting with great interest the development of a dependable, efficient and not over-expensive radio telephone equipment.

There seem to be two outstanding factors that for the time being are preventing the more general use of radio telephone equipment in installations of this nature. The first is that of the clarification of patent rights for commercial use, which is now being agitated, and the second is that of the proper allocation and proportion of wave lengths in radio application, with rigid enforcement and supervision. Secretary Hoover in his recent hearing in Washington, formulated a basic situation that should prevail in the allocation and proportion of wave lengths for radio service, namely, that this allocation and proportionment be based upon the commercial importance of the installation involved, with due regard to doing everything possible in the encouragement of the amateur and his investigations. Due to the fact that over-allocation has taken place in many of the districts of the West, it would be well for power company and industrial executives to take it upon themselves at this time to make application for wave length reserves for their particular needs. This should be done before the system becomes more complicated than it is at present, for the entire matter is one of great industrial importance. Not only is the radio telephone rendering vital service in such installations as that now in use by the Southern California Edison Company in its Big Creek development, where one of its trans-Sierra construction jobs is going on entirely through communication by radio, but the subject is also of increasing importance down in the valleys and in the more populous centers, particularly as a means for keeping communication intact in times of emergency.

Spending the Money Where It Will Help

ALMOST everyone has had something to say on the subject of the railroads—most of it rather monotonous. The railroads must reduce rates, the railroads must reduce rates again, the railroads must reduce rates. As a relief to this chorus, it is refreshing to hear the businesslike voice of Mr. Hoover, to

whom the public is coming to look for sound economic thinking on problems of the day. Says Mr. Hoover:

It seems to me vital that the railroads as our greatest industry should propose a courageous program of broad visioned betterments and if necessary the government should consider giving the use of its superior credit. . . . We talk glibly of giving billions of credits to foreign countries to increase our farm exports. I wish to say with all responsibility for the statement, that a billion dollars spent upon American railways will give more employment to our people, more advance to industry, more assistance to our farmers, than twice the sum expended outside the frontiers of the United States—and there will be greater security for the investor.

The West more than any other section of the country, is dependent upon the service of the railroads. Mileage of railroads in the western part of the United States has increased from 14,443 miles in 1870 to 141,138 miles in 1920, a far greater increase than any other district. Western growth has only been possible because of these continually growing outlets for western products. Water transportation is a help to coast districts, but even this would be of little value without the rail service to the tributary country back of each port.

The railroads have a self interest story which is very similar to that of the power companies. If the West is to grow and prosper it must have electric power—and it must have ever-increasing transportation facilities. If the railroads are to be able to furnish these facilities, they must be in a position to attract capital. The story is familiar and one which should appeal to all business men,—in particular to those engaged in the electrical industry.

The Common Sense Attitude Toward Earthquakes

BEFORE the advent of modern engineering methods in dam and levee building and the institution of the weather bureau, floods were an even more destructive agency in this country than they are today. The study and understanding of lightning protection has minimized the losses to power companies from mountain storms. And now come western scientists with the contention that earthquakes are a periodic phenomenon in the same sense, capable of prediction and worthy of study which shall enable protective measures to be taken which shall greatly lessen their destructive force.

This is the common sense attitude toward this class of catastrophe. Nothing but good can come of the complete mapping of fault lines throughout recent earthquake areas and the study of engineering and architectural provisions against failure in case of a fault slip. It is thought at the present time that the extremely delicate instruments worked out during the war for the detection of submarines may be used in deep wells where they may be placed in contact with substrata, to detect conditions of unusual stress which might indicate the imminence of an earth movement.

Whatever knowledge it is possible to gain on this subject is just so much safeguard against possible future damage.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing,
Trade Promotion, Legislative and Associated Topics that have a
Special Bearing on Western Business

To Investigate Ontario Commission

Premier Drury Criticises High Costs of New
Power Development by Hydro Electric
Commission of Ontario

FROM the emphasis which is being placed upon California discussions of the government-owned power experiment in Ontario, one would think it only necessary to prove this Canadian system a success in order to establish the principle that similar systems should be inaugurated elsewhere in all other communities. As a matter of fact, of course, differences in power generation as well as of power demand make any such proposition a new problem to be solved on its own merits for each locality. If this experiment is not a success, however, its failure is an argument of great pertinency as indicating the faults of such a system under the most favorable of circumstances, with Niagara available as a central and economical source of power.

It is therefore of interest to learn that the recently elected government of the Province is not altogether in sympathy with the work of the Hydro Electric Commission. At a recent meeting called at the request of the business organizations of Toronto in order to ascertain the position of the government in regard to Hydro Commission plans, Premier E. C. Drury stated his disapproval of the lack of accuracy in estimates of future costs and the absence of information in regard to present expenditures and promised an investigation. He said in part:

I do not know, nobody knows, whether the money is being well spent or not, but the people have a right to estimates that are fairly accurate on which to base their judgment before passing on the projects.

In 1918 the engineers of the Hydro Electric Power Commission estimated that 275,000 horsepower could be delivered at Chippawa, Queenston and Niagara Falls for a total cost of \$25,000,000, whereas the cost already has exceeded \$65,000,000.

Likewise, at Port Arthur and Fort William, in the western portion of the Province, the people were promised cheap power by the Hydro Electric Commission, which erected a water power plant at Nipigon. The estimated cost of the plant was \$4,500,000. To date more than \$6,000,000 has been expended and the plant is only partially completed.

Power which was sold by a private company at from \$15 to \$17 a horsepower year is sold by the Commission to the public in Port Arthur and Fort William for \$21 a horsepower year, and in addition the Commission is piling up a yearly deficit of \$300,000.

No business man would tolerate such estimates, which mount up without justification. Such a system is not a benefit, but a burden and that is why the Government is stepping in.

The policy of the Ontario Government will be to see that the projects of the Commission throughout the Province are directed along sane, sound business lines for the benefit of the people.

A New Element in the Tariff Situation

So-called "Trading Clauses" Are of Greatest
Importance to Western Manufacturer
According to California Canner

OVER 66,000 tons of canned goods, not to mention a similar tonnage of fresh and dried fruit, were exported from the port of San Francisco in 1921. This is but one outlet of the several important shipping points on the coast—in fact, a very large proportion of western food products now find their markets in foreign fields. In consequence the western canner has been much concerned with the outcome of the present tariff legislation. He grants the need of high tariffs on citrus fruit and other competitive products in which domestic markets are threatened, but also points out the need for the development of foreign trade.

This is not to be brought about entirely through the lowering of the tariff barrier—it is fully as important to secure the reduction of inimical tariffs imposed by other countries which act to keep out western products. In Latin America, for instance, canned fruits are placed on the luxury list. In France, American canned fish products suffer under tariffs which are much higher than those imposed against the same product from other sources. Western canners are therefore particularly interested in the so-called traders' clauses which have been introduced into the tariff measure. These sections give the President the right and make it his duty to raise the duty in this country against foreign products if the countries of origin are assessing a higher rate of duty against "like or similar products" coming from this country. He is also given the power to reduce tariffs 20 per cent in consideration of like concessions received from any foreign country.

In this connection, Chas. H. Bentley, vice-president of the California Packing Corporation, says:

During the past twenty years persistent efforts have been made in the industry through steamship companies, insurance companies, through banks, through commercial organizations, and through various agencies of our government to bring about a better understanding and better conditions, but these efforts have been without success. So the industry has been forced to the conclusion that our only way of dealing with the situation is to have some trading clauses in our tariff so that we can extend consideration to countries which deal considerably with us, and per contra we shall be in a position to protect ourselves against countries which, in our opinion, maintain unreasonable levels of tariffs against us.

Accordingly, the National Canners' Association has encouraged the various branches of the canning industry to make suitable representations before the Ways and Means Committee at the hearings which began in January, 1921. These have been followed up from time to time by the supplementary briefs through the Finance Committee of the

Senate. Most of the branches of the canning industry have indicated very clearly to these Congressional committees that they are asking for protective tariffs, not so much because they want protection, but to establish a trading basis. In other words, we have to have some tools to work with, and if we are going to secure concessions from foreign countries, we have got to have something to give them in the shape of reduced tariffs in this country.

Important Savings in Mineral Industry

Western Office of Bureau of Mines Records
Important Contributions to Western
Oil and Metal Industry

THERE are two ways of increasing production—one to develop new resources and the other to stop the losses in the processes now under way. Of the two, the second may be said to be the most important in the present campaign for saving waste. Among the agencies which have rendered most effective service in bringing about savings of importance to western industry should be mentioned the United States Bureau of Mines which maintains offices throughout the West.

At the San Francisco station of the bureau, for instance, a special process has been devised for cracking heavy tars and oils which promises the recovery of large yields of gasoline and other lighter products, hitherto regarded as unrecoverable. There still remains some difficulty in the utilization of the pitch like residue which must be worked out before the process is commercially applied, but nevertheless the discovery is one of the utmost importance.

Important results in the utilization of the low grade and complex ores of copper, lead, silver and zinc, which constitutes a great problem in the mineral development of Colorado, Utah and the intermountain region, are promised by the utilization of a new chloride volatilization process recently worked out. The sulphur dioxide leaching of porphyry copper ores of Arizona holds the promise of important developments for the mineral industry of the Southwest.

The Question of the Hour in Oregon

Tax Revision and Acceptance or Rejection of a
Proposed State Income Tax to be Main
Issue in Coming Elections

THE burden of taxes national, state, county and municipal has caused a wave of public protest in many of the western states. Present indications are that in several states political campaigns will be fought along lines of reduction of public expenditures. In Oregon, for instance, it is estimated that during the last decade population has increased sixteen per cent and assessed valuations twenty-three per cent, while state tax levies have increased five hundred and twenty per cent. At present, tax reduction or tax adjustment is the question of the hour in that state. A state tax investigation committee is touring the state and has held many hearings on the subject of taxes. Judging from press reports, public sentiment has been thoroughly aroused and the outcome of the committee's investigation will be widely discussed.

A period of industrial distress and agricultural depression always arouses the sleeping elements of political discontent and radicalism. Oregon is not alone in her "hard times" nor in her burden of taxes, but she does seem to have more than her share of extremists who would cure the present ailments by the single tax, state socialism and such alleged remedies.

A proposed state income tax occupies the center of the stage at present. It is backed by the agricultural interests principally in eastern Oregon, who claim that farmers and stockmen need relief from the present tax system, which, they argue, now requires heavy taxes on a large investment that is showing a small return.

Can a state stop the constantly rising tide of taxation? In every western state there are pending demands which will draw even further upon the tax reservoir. What success will Oregon have in her attempts at revision and reduction? The West awaits the outcome with interest.

Low Rates in British Columbia City

Record of Rate Reductions an Important Feature
of British Columbia Electric Railway
Company's Annual Report

THE central station industry as a whole is proud of the record of small increases and subsequent rate reductions which it can show for the war and post war period. Few power companies, however, can better the figures brought forth by the British Columbia Electric Railway Co., Ltd., as part of their recently issued annual report. According to this record, only nine cities of over 50,000 population in the United States or Canada have lower lighting rates than Vancouver, B. C. This is the result of consistent rate reductions since the date of organization of the system. Even the war period, which was marked by increased rates in most districts, did not affect the steady lowering. Since the beginning of the company, these rates have been as follows:

Until 1900—18c. net; meter rent 25c.
1900-1901—16c. net; meter rent 25c.
1901-1904—16.15c. net; meter rent 20c.
1904-1906—12c. net; meter rent 20c.
1906-1909—10c. net; meter rent 15c.
1909-1918—8.8c. net; meter rent 15c.
1918-1919—8c. net; no meter rent. Minimum monthly charge 50c.
1919 and still in effect—6c. net; no meter rent. Minimum monthly charge 50c.

That the community has prospered under the company's service is indicated by population figures which show that the population of the city of Vancouver in the year of the company's incorporation, namely 1897, was 20,000. It had increased to 52,000 in 1906, 79,000 in 1909, 100,000 in 1911, and decreased to 96,000 in 1916. At the end of 1918 it had increased to 109,000, and the recent census gives Vancouver a population of 116,700.

At the present time the company has under way the construction of an additional unit at the Stave Lake plant which will bring in an additional 13,000 hp., as well as in contemplation the development of 80,000 additional horsepower which will be brought in as demand justifies.

Letters to the Editor

President of California Manufacturers' Assn. Discusses Industrial Problems

To the Editor:

Sir: The problems confronting industry today are most serious in their nature but are by no means insurmountable. The conditions against which we are now contending constitute a stern challenge to our powers of efficiency and of intelligent business administration. That we shall ultimately succeed in readjusting the various economic factors affecting our affairs there can be no question. The process will be favored or retarded, however, according as other elements in the community recognize their true obligations toward invested capital.

The individual must work in order to exist, but not so with capital, for the latter, consisting as it does entirely of savings of the people, may easily take refuge in the strong boxes or secret hiding places of its owners, where it may remain indefinitely secure against loss or deterioration. It seeks employment in business investment only when there is reasonable assurance of gain by so doing and at the slightest indication of danger it promptly retires from further participation in the financing of industry. Those influences which today most seriously threaten the security of invested capital are responsible for the greatest share of our industrial ills.

The present excessive burden of taxation operates greatly to the disadvantage of industry and of business in general, although it must be admitted in all frankness that much of this burden is the inevitable consequence of the debts of war, which debts must be accepted without serious question and legally discharged. Every avoidable tax, however, which is imposed for purposes not absolutely essential must operate to retard the final recovery of business to its normal status.

Unnecessary legislative interference with the conduct of business is also greatly to be deplored during the present period of industrial readjustment. With such a bewildering variety of economic problems demanding immediate solution, the business executive is entitled to at least temporary relief from the paternalistic efforts of various individuals and groups that are intent upon the correction of every known ailment of society through the attempted control by legislative enactment of the details of business. These measures are largely unintelligent in their conception, futile in their application and uneconomical in their results.

It is the constant aim of the California Manufacturers' Association to secure the widest possible recognition of these principles through every reasonable and proper means.

JOHN R. MILLAR,

California Manufacturers' Assn.

President.

Willamette Falls Electric Company is Pioneer in Long Distance Transmission

To the Editor:

Sir: In the January 15th edition of the Journal of Electricity and Western Industry there appears on page 59 under the heading "World Records of the West—From 10,000 V. to 220,000 V.," a picture showing one of the original plants and a statement as follows:

"Previous to the erection of the Pomona line in 1891, sending 11,000 volts a distance of 20 miles, it was thought that electricity could be used only within a small radius of the spot where it was generated. This California experiment ranks as the first record."

I think you are correct in your statement that the California experiment ranks as the first record where 10,000 volts were used for transmission. It may be of interest to you, however, to know that in 1889, on June 3rd, electric energy was transmitted for the first time from the falls of the Willamette River, Oregon City, Oregon, to Portland, a distance of approximately thirteen miles. On June 4, 1889, in the column of the "Oregonian" entitled "Portland and Vicinity," there appeared a side head article entitled "Worked Like a Charm." This article reads as follows:

"The Willamette Falls Electric Company started up one of their Brush arc dynamos last evening, and the electricity was sent from Oregon City for lighting one of their 10:00 o'clock circuits in this city. It worked magnificently and conclusively demonstrated the fact that our city can be lighted successfully from the falls. The result was a pleasing surprise to the company, the percentage of loss of electricity by transmission being much less than their most sanguine expectations. The work of removing the machinery from the station here to the falls will be carried on as expeditiously as possible. Another large dynamo will be moved up today."

The Willamette Falls Electric Company is one of the predecessors of the Portland Railway, Light and Power Company. At the time the station in question was started, arc circuits were the first circuits to be put into commission. Prior to the starting of the hydraulic station at the falls, the company had been operating a steam driven plant at Weidler's saw mill in the northern end of Portland and had installed there some 1,000-v. Westinghouse alternators and various arc machinery, etc. For operating in the new hydraulic plant at Oregon City, some 4,000-v. Westinghouse alternators were purchased and for a number of years they formed the principal apparatus from which the City of Portland was lighted. Such apparatus as was removed from Portland to Oregon City was taken up gradually and the full load was not placed on the water power plant until the latter part of 1889.

Mr. George P. Lowe, who was editor of the first San Francisco electrical publication which, if I am not mistaken, was the predecessor of the "Journal," lived in Portland at the time this plant went into commission and during the 1905 Exposition he was very much interested in gathering together data pertaining to this early plant.

My object in sending on to you this information is merely to indicate that even ahead of the time when 10,000 volts were used to transmit a distance of 20 miles, 4,000 volts were being used to transmit a distance of 13 miles to the sub-station in Portland and thence, by way of circuits, throughout the City of Portland, so that I have no doubt but that we may have approximated 20 miles with some of our circuits, although at the lower voltage.

O. B. CALDWELL,

Portland Railway Light and Power Co.

Vice-President.

N.E.L.A. Executive Says Electrical Industry Should Lead in Bettering Business

To the Editor:

Sir: The fundamental idea that the electrical industry should take the lead in striving for Bigger and Better Business, and for not only insuring a return to normal business, but to a scale of business better than usual, seems to be taking hold all over the country. We have already received numerous requests for specific information as to the plan, and the promises of many of our most important executives that they will get behind the plan are being received from every direction.

I am glad to know that the Pacific Coast has taken hold of this matter so enthusiastically and I believe you are better

organized to conduct this work on the Coast than anywhere else in the country.

I believe that we can get every interest identified with any branch of the electrical industry to work in harmony on one specific general plan to promote the introduction and general use of electricity in all its branches. We are certain that public utilities can secure money today and have a better assured outlook for securing new money than ever before in their history and we believe that by our united efforts we can place our commercial development activities on a higher plane than we have dreamed of heretofore.

The success of the movement in any particular locality will depend very largely upon the enthusiastic support of the public utilities in that locality. We hope and believe that before our convention in May we will be able to report the adoption of this movement by substantially every important public utility company in the country. We then propose to use the convention as a vehicle for securing nation-wide publicity for the movement and to make the commercial program the most active part of our national convention.

For the last five years we have not been able to continue our commercial developments and many of our companies have either disbanded or partially disbanded their sales departments. The time has come when commercial work should be reorganized on a broader scale than ever before.

The Journal of Electricity and Western Industry has it in its power to do more on the Pacific Coast than any other medium because it reaches not only the executives but the rank and file of our member companies, who must also become enthusiastic and work whole-heartedly in support of the movement, and we are counting upon it strongly to use its columns freely and believe that Bigger and Better Business will have a directly beneficial effect upon its business success.

MILAN R. BUMP,

National Electric Light Association.

President.

Declares That Shippers of Green Tree-Fruits in General Lost Money in 1921

To the Editor:

Sir: In your issue of March 1st, 1922, is an editorial which I can hardly agree with. This editorial is under the caption "Lower Freight Rates in the Green Fruit Industry." Paragraph four commences, "Generally speaking, the public is not by any means convinced that the green fruit producers have been hard hit by increased rates."

I will stake my reputation as a grower and shipper that fully one-half if not three-fourths of the deciduous tree-fruit eastern shipments of last season (not including apples) represented a loss to either the grower or shipper or both. In a general way the public heard of a few good sales but did not hear of the hundreds of cars that brought red ink.

Also in an article in the same issue the statement is made that "flourishing conditions apply to horticulture in general, except apples." He should have included nearly all kinds of deciduous tree-fruits with apples or below them.

I recall hearing a large tree-fruit grower, who is also a regent of the State University, state that when you started fifty cars of deciduous tree-fruit last season you kissed profits good-bye. Mr. Stone's article in this issue is a very fair, logical statement. He is talking facts when he says "an illustration can be offered in the precarious situation of the California green fruit industry," meaning tree-fruit.

As long as we have this kind of prohibition, grapes are O. K. Apples are helped a little, but other tree-fruits not at all. With a light crop of eastern fruit and good times we might get by, but change either one and we face a loss.

GEO. W. ASHLEY, Director.

California Growers & Shippers' Protective League.

Radio Bulletins

Business in San Diego is generally profiting from projects which have been undertaken there by the government. A million dollar naval hospital is nearing completion, two dredges are operating constantly in the harbor and the city will soon be one of the principal operating bases of the Pacific Fleet.

The Denver Civic and Commercial Association has adopted a slogan, "500,000 in 1930," and has raised a preliminary fund of \$15,000 to advertise the industrial and agricultural districts of the state adjoining the city.

Secretary of Commerce Herbert C. Hoover is visiting the Pacific Coast in conjunction with the hearings of the Colorado River Commission which are being conducted in the various states which are interested in the development of this river. Meetings have already been held in Phoenix and Los Angeles and others are scheduled for Salt Lake City and Denver. Secretary Hoover is chairman of the Commission.

The eleven million dollars which the Southern California Edison Company received from the city of Los Angeles for the company's distribution system, will be spent on the hydro-electric development program which the Edison company has outlined for this year.

Word from Spokane, Washington, indicates that practically every large lumber mill in eastern Washington and northern Idaho will be in operation within thirty days. Weather conditions are holding up operations. Logs are imbedded in the ice in the mill ponds and the snow is yet too deep in many districts.

The Journal of Electricity and Western Industry has arranged for the broadcasting of news from station 7XF in Portland. The news, which is prepared by W. C. Heston, northwest editorial representative for this publication, is sent out every Monday night at 7:30 o'clock on a wave length of 360 meters.

The Spirit Lake Railway and Power Company of Vancouver, Washington, has been organized and has applied for permits to develop 35,000 horsepower on the Toutle river in northern Washington.

Imports and exports from the Port of Seattle showed a gain of 40 per cent during the month of January, amounting to \$36,560,000. Imports increased approximately four hundred per cent over the corresponding month of the preceding year.

Numerous freight rates asked by the lumber interests of the Northwest, will soon go into effect as the result of favorable action taken at a recent meeting of railway traffic officers. The rates are materially lower than these in effect at the present time. They will apply to all points east of the Mississippi River.

Lumber and wheat hold the center of the stage in the Pacific Northwest. Better prices following increased buying has practically cleaned up the wheat while shipments of lumber are increasing daily. It is estimated that 60,000 men are employed in the Oregon and Washington lumber mills at the present time. This number is being increased continuously. Bank clearings in the Pacific Northwest cities show decided improvement, those of Seattle having increased 25 per cent during the past week, over the same week in March, 1921.

The canning industry in California is facing a prosperous year, according to all reports. The 1921 pack is reported as completely sold at prices higher than expected. The asparagus pack for 1922 has been entirely taken upon futures with many jobbers still clamoring for a share of the pack. Orders were far in excess of the estimated pack. The announcement that the Van Camp interests had negotiated for four canneries in central California has caused some stir. This company announces that it will enter the fruit canning field during the fruit season and will operate its plants during the remainder of the year on other well known non-seasonal Van Camp products.

In the Intermountain District, people are still conjecturing on the opening of the Utah copper mines. The Montana mines have been working on a small scale for more than a month and preparations are rapidly being made to increase the output. Increased building operations are predicted for both Salt Lake City and Denver with the arrival of spring.

Builders of the West

EDWARD F. ADAMS, who has been for twenty-five years one of the leaders of economic and financial thought in the West, as an editorial writer, author and civic leader is truly a builder of the West. In dedicating this issue we have decided to depart from the usual style in which this department has been conducted and quote from an autobiographical sketch which Mr. Adams has furnished us, at our request.

"I was born into the family of a New England clergyman during the period when to enter such an environment was a very serious business. That was quite a number of years ago. While still a child my father removed to the Western Reserve in Ohio which at that time was a miniature New England. As I grew older I came to be known in the community as 'the preacher's devil.' As I do not remember that I was disliked I suppose the delinquencies which brought me that title were such as the gentler ecclesiasticism of these days would call only 'venial sins.' It is highly probable, however, that I was suspected of playing cards and they may have had the goods on me. In that community at that time any lad who did not give outward and visible evidence of early piety—as I regret to say few of us did—was likely to be in ill repute. At any rate if there was mischief done and not accounted for the burden of proof was on me to show that I did not do it. After an excellent academic and partial college course I began life as a dirt farmer at the age of 20 years. In the second year of the Civil War I enlisted in an Ohio regiment as a private, but was later discharged from a general hospital as unfit for service, and not likely to become so. Never before entering the army, during my period of service, or since did I ever fire off a gun. While in the army I drew down \$13 a month and paid \$30 a month to a hired man to take my place as a dirt farmer. None of us were called heroes or got any bonus for many a long year after. And we should not have received it then if the more enterprising among us had not stirred



EDWARD F. ADAMS

Editorial writer for the San Francisco Chronicle, who, as an author and founder of the Commonwealth Club, has been a leader and builder of western ideals and ideas.

us up to make a fuss about it. In those days it was called 'doing politics for the soldier votes.'

"Later I tried to get into the Mississippi Navy as some kind of an officer and though I had an excellent pull, and used it, the doctors would not take me. All of my officer friends who tried to get me in and the scrupulous doctors who kept me out are dead and gone years ago and I, in excellent health, am writing this story. You never can tell. I came to California in 1878, spending the first year as dirt farmer on the Mendocino coast. The next year I accepted a position—meaning got a job—as western agent and lobbyist for a New York publishing house, which I followed until about 1892 when I reformed and became a nice man. In succession after my reform I was dirt farmer, for three years an officer of Cooperative Farmers' Organizations, as we knew them in the nineties and finally in 1898 I completed my

reformation by entering the 'brains' department of the journal which I have served since, thereby finally becoming, as I trust, a truly good man. During the period I have helped start several things, some of which stuck. Among them, in addition to farmers' organizations, I started a summer school of economics and husbandry on my farm in which professors of Stanford and the State University conducted services a month each year for three years. When I left the farm it busted. I served the University of California for several months as conductor of Farmers' Institutes which I had previously worked up. That was long before the College of Agriculture attained to its present glory and when it really needed a friend. For nearly 20 years I was president, or active director, of one of our benevolent societies. I was one of the founders of the Commonwealth Club of which I have been an officer from the date of its organization to the present time. During the last quarter of a century I have published two or three books, which would have greatly benefited mankind if by any possibility mankind could have been induced to read them."

When the Buyer of Location Meets the Seller of Opportunity

A Discussion of the Factors Underlying the Establishment of an Industrial Plant on the Pacific Coast and the Obligations of the Chamber of Commerce or Other Merchandiser of Community Advantages

By WILLIAM H. CRAWFORD

IN every walk of life, we find the relationship of buyer and seller. As a matter of fact, the buying and selling, the exchanging of ideas, of service, of commodities, and of opportunities, is just about the complete measure of human activity.

Eastern industry looms large on the business horizon today as the buyer of location,—the Pacific Coast as the seller of opportunity, and a very difficult problem presents itself, however, from the standpoint of both buyer and seller.

An eastern industry seeking a location usually has a lot to learn in a very limited time about that great empire lying west of the Rocky Mountains, bounded by Canada on the north, by Mexico on the south and by the Pacific Ocean on the west. Pacific Coast communities have the unsolved problem of seeking out legitimate prospects. Every Chamber of Commerce from Vancouver to San Diego has a long list of concerns wanting something for nothing or needing financial assistance. These industries are continually seeking out the seller. But the well financed eastern industries who do not want free land, bonuses or financial help must be sought out, and they must be sold on the basis of real facts that cannot be established except by a complete industrial survey.

The matter of financing is really one that should be taken care of by the proprietors of industry. The problem of the selling agency is to establish good and sufficient reasons why certain industries would prosper at certain points, and to assist in disclosing every obstacle that would prevent success. Empty buildings and smokeless stacks are no credit to a community. The far-sighted chamber of commerce will work as hard to prevent over-expansion of industry as to encourage additions to a community where the conditions warrant legitimate expansion.

Aggressive selling, applied to setting forth the various advantages of different localities has grown to be a business in itself, usually conducted by a chamber of commerce or commercial club. At the same time, every business organization, every banking institution, every newspaper, every magazine, every railroad system, and almost every individual in a community has some part in selling that community.

Since we have likened eastern industry to the buyer, and the Pacific Coast to the seller, we should step outside of the problem long enough to view it well from the standpoint of each.

The Point of View of the Buyer

Consider the buyer, for example, who is not particularly anxious to be sold. Perhaps he has been driven to consider the Pacific Coast because competitors were establishing themselves west of the

Rocky Mountains. Perhaps his attention has been called to the fact that one of the Pacific Coast ports is closer to Manila by 3,515 miles than is the Pacific entrance of the Panama Canal. That by adding 1,402 miles from Panama to New Orleans, he may save a total of 4,917 miles, the equivalent of a trans-Pacific volage, in landing the raw materials of the Orient on the Pacific Coast of the United States for manufacture instead of landing them at a point like New Orleans or farther east. Perhaps, having journeyed west on a vacation trip, or to attend a convention, the buyer is greatly impressed with the Coast country which is building cities astounding to the easterner, and supporting unusual enterprises, reflecting great potential wealth of resource and the character of its people. In any event, we will suppose that the average eastern executive has acquired a wholesome regard for the future of the Pacific "whose shores and islands and vast regions beyond will become the chief theatre of human activities and events in the world's great hereafter."

We are told, time and again, that the files of many eastern industrial plants are filled with applications from the employees for transfer to the Pacific Coast in the event that employer opens a western branch house or factory. There is undoubtedly a westward urge, based on personal desire as well as business opportunity, but the prospective locator has a lot of territory to cover when he tries to make a quick survey of Oregon, Washington, California, Montana, Utah, Idaho, Nevada, and Arizona, comprising 25 per cent of the area of the United States.

If the preliminary trip to the coast has included a run around the circle, from San Diego to Vancouver, or in the opposite direction, the eastern visitor will be impressed with the magnificent distances and the size of the undeveloped areas. First impressions are usually lasting and have considerable bearing on subsequent actions. The unfortunate thing about first impressions on the Pacific Coast is that they may be gained at any one of a number of places along an ocean frontage of 1,670 miles.

When the prospect begins to study population figures, he will realize that a lot of territory must be covered on the Pacific Coast to reach as many people as are sometimes found within the limits of one large eastern city. This means expensive distribution and may cause some apprehensive thoughts. The buyer will hesitate somewhat at this stage of the proceedings but it will not be long until he falls into the hands of a booster (the Pacific Coast is populated with boosters) who will quickly re-establish a temporary peace of mind.

The thoughtful eastern prospect, however, soon decides that he has a big contract on his hands in

selecting a plant location for the Pacific Coast, or in deciding for or against any move at all. He usually returns to the East and lets the matter drop for the time being, or assigns one of his sales engineers to the job of coming back to the Coast and making the necessary detailed survey. This second visitor usually spends a few weeks in traveling over the area, in collecting authoritative information from every available source, in listening to the sales talks and in getting a composite picture of the Pacific Coast that will enable him to report back to his principals. And this is no small task because of the territory involved and of the factors of uncertainty in a rapidly developing, virgin country.

Some decisions that have been made in the past, have been too hasty and have led to over-development at one point with under-development at another. After the decision for a factory location is made, the executives placed in charge, during the next two or three years following the first operation of plant, may find by actual contact with the territory, some place or places that would have been better locations for the industry in question. If a wrong decision has been made, part of the responsibility rests with the seller.

Consider then the seller. With possible over-enthusiasm and with the advantage of a psychological moment in his favor, he may have assisted in bringing about a decision that is not altogether wise. On the other hand, a community salesman from some other point with lack of information or lack of opportunity, may have failed to have effected contact with the buyer, or if effecting contact, may have failed to impress him sufficiently.

The business factors, which determine the location of an industrial plant should be known to every community selling organization and only the highest exponents of the selling art should be employed. A community salesman must at least be one who can write a business letter containing something more than that old musty paragraph "trusting that you will not hesitate to call upon us if there is any further information you require,"—having the effect of a smoke screen, concealing real lack of ability.

Assuming first, that through some form of advertising or publicity, a connection has been established with legitimate prospects, the merchandising of community advantages must then be thoroughly organized. The selling agency must visualize that great economic unit of the Pacific Coast with its four great subdivisions now in process of formation, each with its own particular excuse for existence: the Puget Sound District, the Columbia River Gateway country, San Francisco Bay and Southern California—with nothing but youth against any of them.

With this background, the scattered population must be carefully studied in order to draw the proper conclusions regarding trade territory and Pacific Coast distribution. A nationally operated concern will probably take up the matter of Pacific Coast distribution only after disposing of the problems of national and international distribution. These involve a study of ocean transportation and rail connections.

The total population on the Pacific Coast today (less than eight million people) is so divided that there is a northwestern trade territory and a southwestern trade territory, separated by a zone of relatively insignificant population density. The mileage between these two trade districts is such that two plants would ordinarily be necessitated. The maximum consumption of the total Coast population, however, will sometimes not pay the overhead on two manufacturing or distributing plants. One location must therefore be selected that will combine to the best advantage, Pacific Coast distribution with national and international distribution, as well as with any purely local markets.

Making clear this problem to the eastern investor is a real service on the part of the community salesman of the Pacific Coast. It involves a study of conditions which the engineer sent out for a brief period can hardly be expected to prosecute. The seller can render a priceless service to the eastern investor by working with him on this problem of location with respect to present and future distribution in all its aspects or in guiding him through the maze of detail that involves, first, the selection of the particular city in which to locate, and then the particular spot within that city where operation expenses will be lowest.

The question of property is often raised before the city has been selected. This is certainly putting the cart before the horse. Free land at one point might be more expensive than \$20,000-per-acre land at another. The city or district must be selected first, through a logical and orderly process and then the same general rules must be applied to the selection of the property within that district.

The supply of capital, it has already been pointed out, should be taken care of by the proprietors of industry in the usual way. The supply of raw material, including power and fuel, is a factor that varies with each enterprise and is really easy to analyze. Transportation will have been disposed of in any complete distribution study. The factor of labor is important to the final decision and conditions will be found to vary greatly in the different localities, though generally speaking, the entire Pacific Coast has the advantage of contented labor. It has been truthfully said that where living conditions are good, labor is efficient. Lack of sustained extremes of heat or cold throughout a greater portion of the Pacific Coast territory has a stimulating effect on living conditions, both winter and summer.

The truth about the Pacific Coast is good enough for anybody. So-called attractions of free sites, bonuses and other inducements to bribe locators is not sound merchandising. Furthermore, it is not a necessary expedient by which to influence a desirable industrial institution to locate where it really belongs!

With characteristic western spirit the unified selling efforts of the Pacific Coast are extended most helpfully to Eastern Industry and to Eastern Investors who see their opportunity in the golden Empire that was saved until the last; because it is the best.

Costs of Electric Energy in California Compared with Ontario

Public Utilities in California are Making Energy Available to Their Consumers at a Cost Far Less Than in Ontario when Differences in Taxes and Physical Difficulties are Taken Into Consideration

By ROBERT SIBLEY

Editor, Journal of Electricity and Western Industry

IN comparing the cost of electric power to the people of California and to that portion of Canada receiving power from the Hydro Electric Power Commission it is important to remember that Niagara Falls, combining its continuous flow of water with its large volume, should make the production of continuous power the cheapest for any part of the American continent. Yet the privately owned and publicly regulated electric utilities in California are making energy available to their customers at costs comparable with those paid for energy in Ontario, notwithstanding the physical difficulties inherent in the development of water power in California.

In this connection it would seem especially important to establish the facts pertaining to the distribution of energy to agricultural territory in California and Ontario. In the speech of the personal representative of Sir Adam Beck at the Riverside meeting of the League of the Southwest last December, we find the following statement:

"We are supplying power to practically all the cities and towns in our Province, all of the larger villages, and most of the small ones, and have already constructed over 500 miles of pole lines to supply rural customers in various parts of the province, and, so great has been the demand for power in rural districts, that at the last session of our Provincial Legislature, an amendment to the Power Commission Act was passed, whereby, for the purpose of power supply, the Commission is authorized to divide the Province up into districts, known as 'Rural Power Districts,' the boundaries of these districts being fixed arbitrarily, according to the distance power can be supplied economically from existing power centers, or from lines or power centers that might be established for this purpose."

The speaker neglected to state that this action on the part of the Ontario Legislature of 1921 had been brought about due to the findings of a legislative committee appointed by the Legislative Assembly of Ontario to advise concerning a more equitable system of distribution of hydroelectric power and a more uniform price, wherein the Legislative Committee had the following comment to make: "The amount of power being used by the Hydro Electric Power Commission on the various systems in the Province is 337,170 hp., and of this only 2,500 hp. or less than one per cent is supplied to the agricultural industry." When we compare this situation to the 12,000 farms of California that today have the most wonderful service in the world with a connected load of over a half-million horsepower, which is 13 per cent of the entire connected load, we see how fortunate the agricultural communities of California have been in having the service not of 500 but of 15,000 miles of rural lines.

Comparison of Rural Power Costs

To go into further detail, it will be interesting to compare the cost of electric energy to California farmers as compared to the proposed cost in Ontario, even though the government of Ontario itself proposes to meet one-half the expense of this service. In small hamlets the Commission will now be able to supply domestic service for lighting, appliances, etc., for \$23.00 per year. For lighting homes, other than farms, on highways adjacent to lines, and including use of appliances, the service can be supplied for \$39.00 per year. Energy to operate a 3-hp. motor or range, including service for lighting, irons and toasters, can be supplied to a farm house for \$86.00 per year, while a 10-hp. motor, including lighting and appliances, can be supplied on a farm for \$220.00 per year.

Note what is already being done in California where, it must be repeated, the use of electricity on the farm is unsurpassed. In small towns on one of the great power systems of California the average bill for lighting and ordinary appliance use does not exceed \$20.00 per year. For the same class of service on rural lines the average bill will not exceed \$24.00 per year. A 3-hp. motor or range, including service for lighting, irons and toasters, can receive service from a typical power system for approximately \$50.00 per year, the minimum charge amounting to \$38.00 per year. Service can be supplied from this same system for a 10-hp. motor, including lighting and appliance use, for approximately \$120.00 per year, the minimum guaranteed being not less than \$90.00 per year.

It is difficult to get an equitable comparative statement of cost of service to agriculture, industry and home, since the physical situation in Ontario and in California is entirely different. The major portion of power in the Ontario system is derived from Niagara Falls and transmitted over level country comparatively short distances. In California, on the other hand, the plants are located in the high mountains, often hundreds of miles from the market for the power, necessitating the construction of many storage dams and power houses and long transmission lines over extremely rugged country. Furthermore, the water supply in California is not continuous, and it is necessary to supplement the water by steam power. Then, again, taxes in the state of California are in a large measure raised from her public utilities, while in Ontario the taxes paid by the Hydro Commission are insignificant in comparison.

THIS article is the second of a series of three based upon a personal investigation by Mr. Sibley of the operations of government development of hydroelectric power in the Province of Ontario. The following article will deal with a statistical contrast of the growth of California and Ontario.

I think it may fairly be stated that the building of giant dams for storage reservoirs and the maintaining of steam standby service in California, due to fluctuating stream flow in the mountains, necessitates an extra installation expense of from 15 to 20 per cent over the installation expense in the Province of Ontario. And, again, the extra cost involved in the construction of long distance transmission lines over hazardous mountain passes, and the extra energy losses in long distance transmission in California, in comparison with the average short line transmission losses involved in the Province of Ontario, with its comparatively level country, should reasonably involve an additional 10 to 15 per cent cost for service in California over and above the

sively prove the advantage of one over the other. Partisans defending either side of the issue often seek to convince the listener by this method which is extremely dangerous and misleading.

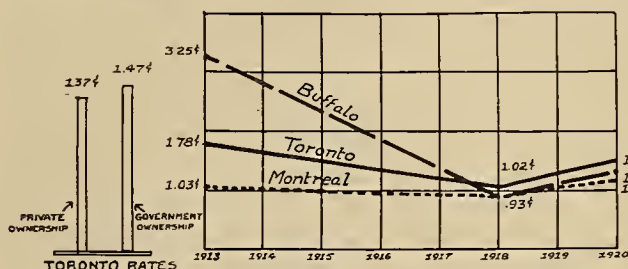
The Only Correct Basis of Comparison

No individual comparison of rates can be made between California and Ontario since the rate-making methods employed in Ontario have resulted in a widely varying cost of power, placing at a disadvantage those municipalities which are not near the source of power or near the main lines of the systems. In California it is the aim to equalize costs and not penalize the more distant consumers by pyramiding the cost to them simply because of distance from source of supply.

While both in California and in Ontario power is sold to consumers at cost, in California "at cost" include taxes, and a fair return on the investment. In Ontario, taxes are eliminated on electric utility property, excepting land. While the relief from the payment of taxes permits the government electric utilities in Ontario to reduce their costs for power by a corresponding amount, this only results in a transfer of the costs from the power consumer to the taxpayer, whether or not the taxpayer is a power consumer.

Despite all these conditions making for cheaper power in Ontario the fact remains that the power rate in California averages equal to or below that of Ontario.

The only fair and economic method of comparison is to take the sum total of electrical energy delivered to California consumers and divide this total into the total money received for this service,



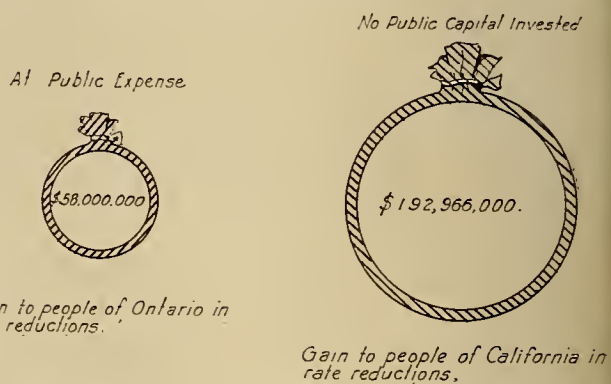
COMPARATIVE CITY RATES, ONTARIO AND ELSEWHERE

The only Ontario figures which are given in a form possible of comparison are the city rates. These show that at the present time, both Buffalo across the border and Montreal, the leading city in the adjacent province of Quebec, enjoy lower rates under privately owned companies, than does Toronto under the Commission. In Toronto itself, the rates of the privately owned company in competition with the Hydro Electric Commission are the lower of the two.

costs involved in the hydroelectric development in the Province of Ontario. In addition, the state and federal taxes paid by California utilities is between 7½ and 11 per cent of their gross income and exceeded five million dollars in 1920. In the Province of Ontario only a small fraction of this amount is involved, amounting to less than \$115,000 in 1920. In any just comparison of cost of electric service in California, as compared with rates charged in the Province of Ontario, it would seem obvious that California costs of hydroelectric development per horsepower should exceed those of the Province of Ontario by from 30 to 40 per cent, and consequently charges for service might reasonably be expected to be proportionately high.

Most of the available power sites in California are scattered along almost inaccessible mountain streams with comparatively small amounts of power available at each site. A comparison of the average California development of around 20,000 hp. with the single development of 500,000 hp. of the Chipawa plant of the Hydro Electric Power Commission clearly indicates how unit hydroelectric costs per horsepower in California should at times exceed those at Niagara, from 100 to 200 per cent, depending upon the conditions surrounding the development. The maintenance of a necessary steam auxiliary service is a handicap which may double the operating costs in California compared with the continuous water supply of Niagara.

A mere comparison of a few rates for power service in the Province of Ontario with a few instances in California does not in any way conclu-



THE SAVINGS TO CONSUMERS IN RATE REDUCTIONS

Dividends to the people, according to advocates of the Ontario Commission, may fairly be reckoned in terms of money saved over a given period through rate reductions—and they point to the 58 millions which were saved to the people of Ontario in ten years' time. In California under private companies publicly regulated, the saving amounted to \$192,966,000, or something like three and one-half times the Ontario amount. This further is without any investment or risk to public funds.

and thus get the actual selling price for electrical energy per unit of energy sold. Next, compare this basic unit with a unit charge for service similarly computed from the Ontario method of development, after allowing for the differences in development hazards experienced in one district and not experienced in the other, and a proper allowance for the light payment of taxes in the one community and the heavy payment of taxes in the other.

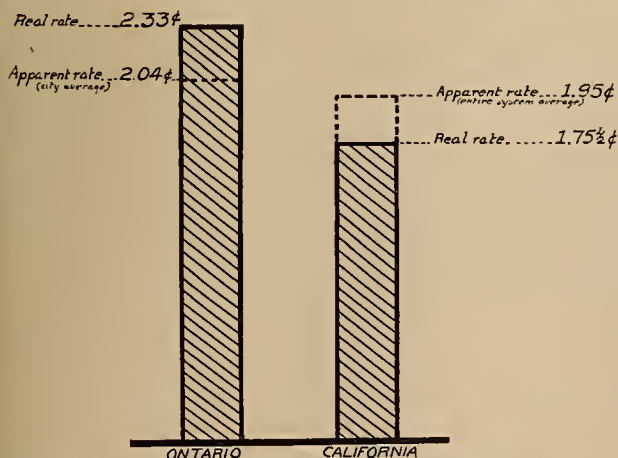
In a recent letter from the chief engineer of the Hydro Electric Power Commission of Ontario, I am advised that these general figures are not available for Ontario. In other words, the Commission has never gathered this important statistical data. A careful study of available data, assuming a load factor similar to that prevailing in adjacent territory, both in the United States and Canada, however, reveals the fact that the average charge to consumer on the Ontario system is 2.04c. per kilowatt-hour, delivered to the city distribution mains. If the same methods of accounting were used by the Hydro Electric Power Commission as are prescribed by the California Railroad Commission, this figure would read 2.33c. Assuming a 25 per cent loss in the city distribution system the average city rate in Ontario to the ultimate consumer is three cents, or over, which is the same general average that prevails in California cities. In California, on the other hand, the average charge to consumer of all energy sold is 1.95c. per kilowatt-hour, or, deducting the amount paid in taxes (which is not represented in the Ontario rate), 1.75½c. per kilowatt-hour. The California rate quoted above was obtained from 1921 figures and would be even lower during normal times when industrial demands with their low rates would further reduce the average rate.

The average rate which is quoted above for California of 1.95 cents per kw-hr. is computed from the following records of the California State Railroad Commission. Although there are approximately forty companies supplying electric service in California, these companies produce eighty per cent of the power sold in California.

STATE RAILROAD COMMISSION RECORDS

Calendar Year 1921

	Kw-hr. Sales	Revenue
Pacific Gas and Electric Company.....	1,021,820,689	\$22,898,046.92
Great Western Power Company.....	340,060,361	5,947,710.73
San Joaquin Light & Power Corporation.....	313,791,835	5,084,780.88
Southern California Edison Company.....	840,081,210	15,074,480.00
Total,	2,515,754,095	\$49,005,018.53



COST OF POWER TO THE ULTIMATE CONSUMER

The average cost of power to the ultimate consumer in the cities of Ontario per kw-hr. delivered to the city distribution system, is 2.04 cents. Were accounting methods in the figuring of depreciation and like items for the Province of Ontario made to conform to those in effect in California under commission regulation, this figure should read 2.33 cents for purposes of comparison. Assuming the customary distribution losses of 25% in delivering this energy to the consumer, this average charge becomes about three cents, which is about the same average rate that prevails in the cities of California. On the other hand, taking into account the entire sale of power from four large companies of California who deliver eighty per cent of the entire electric energy of California, we find the average rate to the ultimate consumer is 1.95 cents per kw-hr. or, deducting the tax to place it on a comparable basis with the tax free sales of Ontario, just about 1.75 cents per kw-hr.

Regarding Mythical Savings

Rate comparisons made under any other basis than that of general averages in costs to the ultimate consumer after taking into consideration all the varying factors involved are deceptive. This same fallacy in reasoning can creep into the discussion in instances other than rates charged. To give an example of how easy it is to lay claim to great savings when in reality these savings should be credited to the march of progress and invention, I would call attention to another statement of the speaker at the Riverside meeting. In speaking of the rate reductions claimed by the more economic operation of the Hydro Commission, he said:

"If the rates are reduced, and the consumer pays less for the service he received, that reduction, I maintain, is the consumer's dividend, just as much as if a check were handed to him by the municipality each month for the amount of the reduction in his power and lighting bills for the service which he receives, and for the current used for lighting alone. Since the hydro municipalities first began to operate, the saving in rates charged over what would have been paid at the old rates amounts to over \$38,000,000.00 and at least \$20,000,000.00 more on power used, or a total of over \$58,000,000.00 paid to the users of power and light, the shareholders in the scheme in ten years' operation, five of which were fraught with unprecedented difficulties created by the greatest economic upheaval the world has ever witnessed."

I am wondering who will lay claim to the fabulous saving in power bills that has been accomplished in California since 1907 when the average rate paid for power generated was 2.15 cents per kilowatt-hour, according to the U. S. Census, which rate, according to the same source, was reduced to 1.55 in 1912 and 1.45 in 1917, being raised again to 1.55 in 1921. Using the same line of reasoning of the above speaker it is evident that the people of California have been paid in dividends in the form of reduced rates under the method of utility regulation that prevails in that state the gigantic total of \$192,966,000.00, as estimated in the following tabulation.

YEARLY SAVING

Year	Power Generated in Millions of Kilowatt-Hours	Rate Saving Per Kw. in Cents	Dollars Saved
1921	4,386	.6	\$26,316,000
1920	3,661	.65	23,800,000
1919	3,311	.666	22,050,000
1918	3,037	.675	20,500,000
1917	2,783	.69	19,400,000
1916	2,356	.675	15,800,000
1915	2,168	.666	14,450,000
1914	2,025	.65	13,160,000
1913	1,901	.625	11,890,000
1912	1,653	.6	9,910,000
1911	1,401	.5	7,000,000
1910	1,208	.4	4,830,000
1909	1,050	.25	2,620,000
1908	825	.15	1,240,000

Total Estimated Saving, \$192,966,000

Despite the fact that a dispassionate consideration of both rates and service reveals the advantages of the privately owned and publicly regulated California system, in comparison with the government owned and controlled system of Ontario, nevertheless there are those who would bring about similar conditions in California through the adoption of the proposed Water and Power Act. It is most important that the true facts be widely disseminated.

California's Prosperity Depends on Future Supplies of Fuel

Industrial Growth in California Depends Upon Availability of Fuel and with the Exhaustion of Present Oil Fields Coal Must Be Imported in Connection with Export Trade Development

By C. H. DELANY

Extracts from a paper read before the San Francisco Section of the American Society of Mechanical Engineers

A RECENT joint survey made by the United States Geological Survey and the American Association of Petroleum Geologists, estimates that the quantity of oil recoverable by present methods remaining in the ground in California on January 1, 1922, including known and probable fields, amounts to 1850 million barrels. For some years the production of oil in California has been in excess of 100 million barrels per year, so that it appears that if the present rate of production could be continued, the oil supply would be exhausted in less than twenty years. The estimate represents the best judgment of the geologists, but unknown fields may be discovered in the future, so that it is impossible to predict with any degree of certainty how long the oil supply will last. It seems inevitable, however, that some day, perhaps ten, twenty or forty years hence, we may find ourselves without a sufficient quantity of oil to meet our needs as fuel.

While it is true the development of new oil fields in the state may increase the total supply of oil, it is also probable the development of methods of oil refining will in the future make available more and more of the oil for gasoline and other valuable products and leave less for fuel purposes. It is also probable that the many advantages of oil for marine purposes will tend to sooner cut off the supply for many uses for which fuel is required on land. It therefore seems appropriate at this time to discuss the situation in which we will some day find ourselves when the present fuel supply is cut off.

An adequate supply of fuel for power and industrial purposes has in the past been the controlling factor in the development of industry and population. Fuel is the foundation of development, and the industrial growth of any country depends more than anything else on the availability of fuel. Nowhere can this be shown more clearly than by a study of the industrial development of California, since the oil industry developed a cheap and ample fuel supply.

The population of California has more than doubled since the year 1900 when oil production became the predominant factor in the fuel supply. In the same period the value of the products of industry has increased over six times. It has been estimated that at the present rate of growth there will be a population of ten millions in California by the year 1950.

California Oil Production

The production of California oil, as shown by the records of the State Mining Bureau, has increased from 4,329,950 barrels in 1900 to 114,800,000 barrels in 1921. About 8 per cent of this is used as

fuel in the oil industry itself, and over 80 per cent of the remainder is distributed as fuel to the industries of California and other states. The most reliable data on distribution and uses of California oil are found in the Report of the Committee on Petroleum of the California State Council of Defense, published in July, 1917. The following data, obtained from this report, indicates the territory served by California fuel oil in 1917:

Distribution of California Fuel Oil
(Crude and Residuum)

	Bbls. per Month	Per Cent
California	4,467,000	63.8
Washington-Oregon	1,090,000	15.6
Canada	326,000	4.7
Arizona	346,000	4.9
Nevada	85,000	1.2
Mexico	50,000	0.7
Central America	156,000	2.2
South America	299,000	4.3
Hawaii	132,000	1.9
Alaska	37,000	0.5
Miscellaneous	12,000	0.2
Total,	7,000,000	100.0

The following table shows the purposes for which oil was used as fuel in California during the year 1917:

Fuel Oil Used in California (Alone)
(Crude and Residuum)

	Bbls. per Month	Per Cent
Railways	1,956,000	43.8
Steamships	555,000	12.4
Public Utilities	655,000	14.7
Mining and Smelting	52,000	1.8
Industries	483,000	10.8
Lime and Cement	158,000	3.5
Sugar Refining	103,000	2.3
Agriculture	73,000	1.6
Heating Buildings	150,000	3.4
Miscellaneous	282,000	6.3
Total,	4,467,000	100.0

It is thus seen that in 1917 the quantity of oil used as fuel in California amounted to 4,467,000 barrels per month, or at the rate of 53,604,000 barrels per year. On the basis of $3\frac{1}{2}$ barrels of oil to one ton of coal, this quantity of oil is equivalent to 15,300,000 tons of coal. In addition there were used in 1917 in California over 700,000 tons of coal, bringing the total annual fuel requirements of the state up to an equivalent of 16,000,000 tons of coal. The population of California in 1917 was somewhat over 3,000,000, so the fuel requirements amount to about 5 tons of coal per capita. This compares with an average coal consumption throughout the United States for the year 1920 of 5.7 tons per capita. It is evident, therefore, that if the growth of California is to continue at the present rate, producing a population of 10,000,000 by 1950, and if the supply of California oil is cut off, we shall require by that time for fuel purposes the equivalent of 50 million tons of coal per year.

Hand in hand with the development of the oil industry has gone the development of the hydro-electric power industry, which is of course also

responsible in a large part for the development and growth of California during the last 20 years. There is an impression among many that hydroelectric power will serve as a substitute for fuel and that when our oil supply has been used up we shall simply have to turn to the "white coal" of the Sierra Nevada Mountains.

There are many industries, however, that cannot do without fuel of some form, regardless of the quantity of electric power available. Of the 655,000 barrels of oil used per month by public utilities, probably at least one-half was used for the manufacture of gas. Gas is a direct product of the oil itself, and if oil is no longer available some other fuel must be substituted for it. Lime and cement works used 158,000 barrels per month. Electric power is already used extensively in these industries for operating the machinery, but fuel of some sort must be used in the kilns themselves. Heating by electricity is a possibility, but electric energy is of far greater value for the production of power than for the production of heat, and it is certain that the heating of buildings and industries requiring heat such as fruit canning or sugar refining will continue to demand an adequate supply of fuel.

Even if it were practicable to substitute electric power for all the industries which are now using fuel oil, it must be borne in mind that there is a limit to the quantity of hydroelectric power available. H. G. Butler, former Power Administrator for the state of California, has estimated (Journal of Electricity and Western Industry, June 15, 1921) that the present rate of growth of the hydroelectric power industries, the economic limit of hydroelectric development in California will be reached in the year 1941. This limit of course, will be reached sooner if hydroelectric power is substituted for fuel oil wherever practicable, such as by electrifying the railroads and by the greater use of electric power in industry.

On the other hand, future developments in transmission engineering may make it economically possible to bring power into California from distant sources, thus postponing the date of reaching the economic limit. Undoubtedly, the more rapid the development of hydroelectric power, the longer it will be before our fuel oil resources are exhausted; but, as a matter of fact, this is merely postponing the inevitable, and it is obvious that after the limit of hydroelectric power is reached the fuel requirements will increase faster than ever if the development of the state is to continue.

The question, therefore, is what kind of fuel is to be used after the California oil is exhausted, and where is it to come from? At first thought, it would appear that fuel oil may be imported from other countries. However, on investigation we find that the petroleum supply of the whole world is quite questionable and cannot be depended upon to last more than 20 or 30 years, and as California would be in competition with the rest of the world for its use, we cannot count on a supply of imported oil that would meet our requirements. Natural gas is available in certain sections of California, but its use

is only local in these particular sections, and it cannot be considered as a fuel supply for the whole state; moreover it is probable that the natural gas supply will be exhausted sooner than the oil supply.

Coal Is Only Alternative

We must, therefore, turn to coal as the only reliable fuel for the future, and the problem therefore becomes a question of where can the required supply of coal be obtained at the least expense and in a manner best suited to our own development.

The United States is richly endowed with an apparently inexhaustible supply of coal, containing, it has been estimated, almost forty per cent of the total world supply. These coal deposits are distributed very widely throughout the country, but the quality of the coal varies greatly in different states. Coming farther west we find the vast deposits of lignite in North and South Dakota, Colorado and New Mexico, with a few isolated deposits of bituminous coal in Montana, Wyoming and Utah, and a small amount of anthracite in Colorado. It is not surprising therefore to find that the coal deposits of the Pacific States are almost entirely low grade lignites, high in moisture and ash and low in heating value.

A very complete survey of the coal resources of the world was made by the International Geological Congress held in Canada in 1913. Their report includes estimates of the area of coal fields and the quantity of coal available in the ground in various parts of the world. From this report the following information has been selected, applying to the Pacific Coast and neighboring states:

Coal Reserves of Western States

	Area, Sq. Miles		Estimate of Original Amount of Coal, Million Metric Tons	
	Known Coal Fields	Possible Coal Fields	Low Grade Lignite or Sub-Bituminous	Fair Grade Bituminous
California	10	30	15	25
Oregon	90	140	907	.....
Washington	1800	.....	47588	10365
Idaho	230	1000	90	544
Nevada	.....	.....	.....	.....
Utah	3646	.....	141	3630
Arizona	3610	.....	12832	9
New Mexico	13220	.....	156903	17173

It will be noted from the above that the supply of coal in California is insignificant. There are four coal fields in California from which coal has been produced in commercial quantities, although the production has been reduced to little or nothing since the advent of fuel oil.

Characteristics of Western Coal

California coal is low grade lignite, running from 9,000 to 12,000 B.t.u. per pound. Owing to the small quantity available it need not be given serious consideration as a substitute for fuel oil.

Oregon has a considerable supply of low grade lignite in the Coos Bay region, much of which has been imported to California in former years, although the output from the Oregon mines has always been small. Owing to its low grade it would not be a satisfactory source of supply of fuel for power purposes, although it has met with favor when used for domestic purposes.

The state of Washington has available large quantities of coal of a variety of grades. In this respect it differs from the other Pacific Coast states.

Anthracite and a good grade of semi-bituminous coal are found near the Cascade Mountains. The deposits of anthracite are small and, owing to lack of transportation facilities, do not have an important bearing on the present subject. Bituminous coal is mined extensively and is of fair quality. Large deposits are found to the west of the Cascade Mountains, within 50 miles of Puget Sound. Sub-bituminous coal or lignite, is found extensively within a few miles of Puget Sound, but cannot be transported without losing much of its heating value. The development of the mines of both Washington and Oregon has been kept back on account of the competition of California oil. It is probable that when developments are made on a large scale that Washington coal will prove one of the main sources of supply for California in the future.

Most of the coal now used in California comes from Utah, which state has a large supply of fairly good grade bituminous coal. Many mines are now in active operation and coal is one of the principal resources of the state. However, owing to the high freight rate this can never be a cheap coal on the Pacific Coast.

New Mexico has abundant reserves of coal. The San Juan region alone, which is in the northwestern part of New Mexico and is tapped by the Santa Fe Railroad, is estimated to contain over 150,000 million tons. Some of this coal now finds its way into California, but as it is a poorer grade than the Utah coal and must absorb as high a freight rate, it is not likely to become a serious factor in the fuel supply for California. In 1918 about 7 per cent of the coal used in California came from New Mexico.

Practically no coal is now mined in Arizona, Nevada or Idaho. The coal fields are mainly inaccessible or produce coal of an inferior quality.

Possibilities of Alaskan Coal

The most promising supply of high grade coal for the Pacific Coast is in the territory of Alaska. Alaska is rich in coal deposits which have been divided in the Survey into three sections, namely, the Pacific Coast section, the Interior Region and the Arctic Slope. For the purposes of this article only the Pacific Coast section need be considered. This section, which is in the southern part of the territory bordering on the Gulf of Alaska, contains 458 sq. miles of known coal fields and over 8,000 sq. mi. of possible coal fields. The coal available is of all character, from low grade lignite to the highest grade semi-bituminous and anthracite. The quantity available is estimated as follows:

Alaska-Pacific Coast Section

	Estimated Amount of Coal Million Metric Tons
Lignite	1971
Sub-Bituminous	485
Bituminous	2
Semi-Bituminous	1293
Anthracite	1931
Total, 5682	

No coal has as yet been exported from Alaska, but it is probable that this will eventually become one of the main sources of coal for the Pacific Coast, especially for such purposes as require the higher grades of coal.

Turning now to the possibility of importing coal from foreign countries, we find that the nearest foreign coal available is that on Vancouver Island. Much of this coal, which is a fair grade of bituminous coal, has been imported into California in the past from the well known Wellington Mine. There are 185 sq. miles of known coal fields, with possible 645 sq. miles. The quantity of coal available is estimated at 5,191 million tons. Large reserves of coal are also found on the mainland of British Columbia.

Turning to South America, we find a good grade of bituminous coal located in Chile. This coal is near the coast and could readily be shipped. There is also in Chile some anthracite coal of excellent quality. There are 680 sq. miles of known coal fields in Chile, and the quantity of coal available is estimated at 2,000 million tons. In Peru there is also an abundant supply of coal, although very little is mined at the present time.

With the present development of commerce with the countries so far considered, if large importations of coal were made there would be no return cargo for the ships carrying it. In other words, unless commerce can be developed to such a point as to bring about a considerable export trade from California to Chile or Alaska, as the case may be, the cost of transportation of coal would be doubled by the necessity of sending the ships back in ballast. It is thus evident that the question of future coal supply for California is intimately associated with the development of her export trade. This leads us to consider the possibility of importing coal from countries at a greater distance, with which trade is most likely to develop. Previous to the development of the California oil industry coal was imported from Australia, Japan, England, Wales and Scotland, as well as from British Columbia. A large fleet of sailing vessels brought coal to California as ballast and went away laden with wheat. The future development of commerce will bring about a similar condition, for as long as our exports are greater in bulk than our imports, vessels will be looking for return cargoes, and they will bring coal as soon as there is a demand for it.

Some of the world's greatest coal deposits are found in China. It is estimated that China contains 999,000 million tons of high grade coal, amounting to about one-fifth of the total world's supply. Half of this coal supply is supposed to be anthracite. Some of the coal fields are located fairly near the coast, so that with the cheap labor available in China for mining it would be possible to ship the coal at a low price.

To sum up, while the exhaustion of our oil fields will deprive us of a native fuel, there is no cause for alarm. Domestic coal can be secured from Washington and from Alaska, where there is a supply sufficient to last us for hundreds of years. Besides this, our ports are open to the commerce of the world. The demand for coal will assist our trade by providing a return cargo for our ships, and the greater our export trade the easier it will be to secure an adequate supply of coal.

Federal Highway Appropriation Will Benefit Western States

Development of New Roads and Trails in the National Forests in the Eleven Western States Will Make Scenic Recreation Grounds Accessible as well as Assisting Greatly in Fire Protection

THE National Forests contain a total of more than 156,000,000 acres of land in the ownership of the United States and embrace much of the most rugged, densely timbered and least developed regions of the country. By far the majority of this acreage lies in the eleven western states. The need of a complete system of roads and trails for the protection, management and development of these vast regions is obvious.

The work of providing an adequate system of roads and trails in the National Forests has been progressing steadily since 1905 when the Forest Service became charged with the administration of these regions. Early appropriations were small, however, and it was not until recent years that impressive progress has been made upon the work. Appropriations previous to that in the Federal Highway Act of November 9, 1921, consists of \$19,000,000 under the acts of 1916 and 1919 and also a provision in an act of 1913 which permitted the Forest Service to use for improvements 10 per cent of the receipts each year from the sale of timber and other Forest products. This latter fund has amounted so far to slightly more than \$3,000,000. Under the past appropriation there has been expended about \$20,000,000 but a great deal of work still remains to be done. According to the best estimates prepared by the Forest Service there are about 5400 miles of road still required to complete the state highway systems traversing the National Forests or contiguous to them. About 8500 miles of roads are needed to complete the county highway system within the forests. Additional roads required principally for the protection and utilization of the resources of the National Forests aggregate more than 13,000 miles. Aside from the roads, the pack trails needed in the National Forests, principally in connection with fire protection work, will entail about 40,000 miles of further construction. The total cost of providing all these transportation facilities will involve an outlay of approximately \$140,000,000.

Of the \$15,000,000 recently apportioned by the Secretary of Agriculture among 27 states, Alaska, and Porto Rico for the construction of National Forest roads and trails, \$9,500,000 known as the "National Forest Highway Fund" is set aside for roads of primary importance to states, counties and National Forest communications; \$5,500,000 constituting the "National Forest Development Fund" will be used for the construction of roads and trails needed for the administration and utilization of the Forests themselves.

These appropriations will give a new impetus to the work of opening up vast tracts of valuable timber and areas of scenic beauty for the use and enjoyment of the American people. The development of roads and trails throughout the Forests will

aid materially in fire protection. At present there are large areas of trackless wilderness within the National Forests that can not be reached by trails. When lightning storms sweep over these inaccessible areas, heavy fire losses of public timber often occur.

Speed in reaching a forest fire is just as important in protecting the country's forests as is speed in city fire protection. But high speed within the National Forests means 4 or 5 miles an hour over a mountain trail. If no trail exists it is often impossible for the fire fighters to average more than one-fourth of a mile in an hour.

In the past, construction of many urgently needed forest roads has been deferred for lack of sufficient funds. Much of this work can now go forward.

The distribution in the eleven western states of the "National Forest Development" and "National Forest Highway Funds" is as follows:

State	National Forest Highway Fund \$9,500,000	National Forest Development Funds \$5,500,000	Grand Totals
Arizona	598,189	280,722	878,911
California	1,460,871	703,822	2,164,693
Colorado	717,058	336,360	1,053,418
Idaho	1,097,894	1,088,656	2,186,550
Montana	878,886	574,615	1,453,501
Nevada	207,984	56,377	263,361
New Mexico	458,258	219,662	677,910
Oregon	1,157,109	718,555	1,875,664
Utah	371,776	164,258	536,034
Washington	708,133	602,889	1,311,022
Wyoming	479,000	267,101	746,101
Totals,	8,135,158	5,012,007	13,147,165

Many large areas are still entirely without even the simplest trail facilities. Valuable forests which will be urgently needed in the future are being jeopardized by reason of the fact that they are without adequate roads or trails by which fire-fighting supplies and men may be brought in in case of need. The primitive conditions existing on some of the Forests are but little realized. Many sections are entirely without roads, while others are served by roads which are simply wagon tracks through the woods, and are narrow, dangerous, steep, and entirely unsuited to travel.

During the past five years the average annual loss of National Forest timber by fire was approximately \$1,500,000, and the cost of extinguishing fires about \$1,200,000. An adequate system of roads and trails would materially reduce both items, would be of great public utility for general travel and traffic, and would further serve the public by lessening the destruction of resources essential to local prosperity. The system of transportation should be completed at the earliest practicable date consistent with other pressing public needs.

Fires will not await our convenience. Next to the integrity of the title to the soil itself, nothing more vitally affects the future of our National Forests than adequate protection from fire.

Federal Road Funds Shared by National Forest States

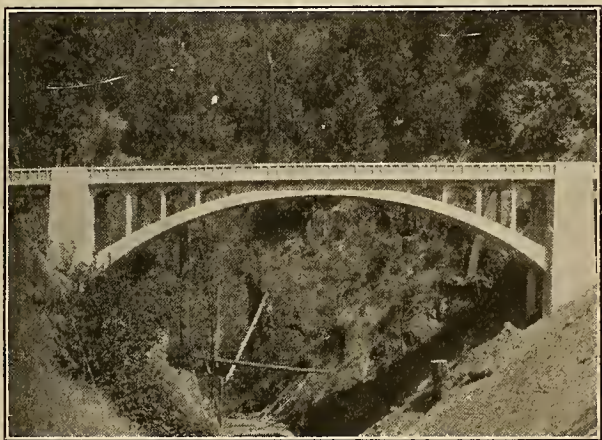
One of a Pictorial Series Featuring Interesting Applications of Electric Service,
Advances in Home, Industrial and Power Construction and Noteworthy
Developments in Western Progress



Road built by the Forest Service down Kootenai Canyon in Montana. The Secretary of Agriculture recently apportioned \$15,000,000 among 27 states for the construction of such roads and trails in the National Forests.



Diamond Lake, near the summit of the Cascades in the Umpqua National Forest in Oregon. It is such scenery as this that the Forest Service will open up to the public through the construction of roads and trails.



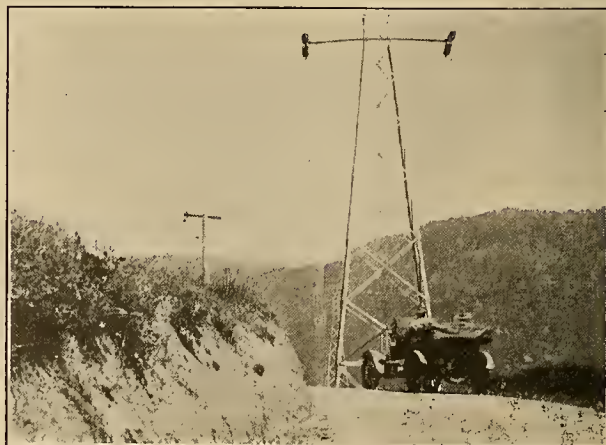
Pacific Highway bridge in the Umpqua National Forest, built by the Bureau of Public Roads in cooperation with the Oregon Highway Commission and the Forest Service.



A popular type of suspension bridge erected by the Forest Service in the Clearwater National Forest in Idaho. This view shows the result of forest fire devastation.



Forest Service trail in the Angeles National Forest in California. The development of roads and trails throughout the forests will aid materially in fire protection as well as open up areas of scenic beauty for campers.



Where the Southern California Edison Company's power line crosses the Forest Service road in the Sequoia National Forest in California. Most of the recent appropriation will be expended in the eleven western states.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

THE RETAIL SALESMAN

How can the salesman learn to analyze his abilities, and his own needs, and how, by such means, can he improve his methods, increase his earnings and give better backing to a firm's advertising?

The modern salesman is finding it a little bit more difficult to increase his income than the average union laborer. This is because many firms are now basing salaries on net returns.

Some stores sell on a 4 per cent basis, some as high as 8 per cent, while many pay only 2 per cent. Regardless of the commission, the salesman must sell more merchandise if he is to increase his income, and the only way that he can make these increases is carefully to study the four general divisions which thousands of other salespeople have studied in the last ten years. They are:

1. Appearance
2. Language
3. General Intelligence.

As to appearance, almost every large department store now has a standard for their saleswomen. Why they never studied the appearance of their salesmen is something I have never understood. In the clothing and shoe fields a great deal of progress has been made in the general appearance of the salesman.

I have always believed that these things should be carefully considered by a salesman—first his haircut, then the collar, shirt, clothing, shoes, and the appearance of his face and hands.

Out of a group of a hundred salesmen, you will seldom find more than ten men who are well groomed and who have a clean appearance.

A sales conference in New York at one time analyzed more than 100 men, having other men pass on the men examined. Eight men had hair cuts that passed; twenty had collars that were the right size and right style; ten had neckties that harmonized with their shirts; fifteen had shirts that fitted and were of the right sleeve length; twelve had suits that fitted and were pressed and clean; while only eighteen had shoes that fitted with heels that were not run down.

It is hard to criticize a salesman's appearance, but if the salesmen and saleswomen are not carefully groomed, absolutely clean from head to foot, and trim in appearance, they lose greatly as the customer approaches them.

Any salesman can dress better for the same amount of money. The trouble with most salesmen is that they compromise and buy cheap things. They do not study colors and almost invariably, they are too "flashy." If their appearance is right, customers

sense it very quickly, and the customer unconsciously buys more readily.

Now, as to language—there are more than 600,000 words in the English language, but the average salesman uses less than 5,000 in his daily selling.

There are four simple ways of improving his English.

First, study grammar, using a simple book.

Another method of improving your language is to read books rich in descriptive matter, such as those which Dickens wrote. Dickens was an artist in describing things. Of course, the stories are good in themselves, but the idea is to learn how to describe things accurately and create mental pictures for the customer.

Another way to improve your English is to write continuously. Sit down every night and write two or three advertisements on the merchandise you are selling. Show them to your wife or to your associates in business, and get them to criticize them. Writing six advertisements a week of 100 words each, means that you have written 600 words each week, and if you continue it every week for a year, you will write 30,000 words in a year. This would show how meager is your vocabulary.

Another method is to cultivate the acquaintance of lawyers, preachers, men of college educations. Spending a half hour or so with such people will show you the importance of clean, pure, business English. These people were compelled to study good English. They had to go through college to get their degrees. They associate with people who talk pure English.

If a salesman's appearance is 100 per cent and his language is accurate, clean, and free from slang, he has an advantage over the other salesmen, who are careless about their appearance and pay no attention to their vocabularies.

A successful salesman should also have general intelligence. By general intelligence is meant that the salesman must study merchandise. Salesmen selling underwear would never attempt to sell a man from ten to twenty suits at the beginning of the season. Yet there are thousands of men who don a clean suit every morning. A salesman who uses two suits during the week can't understand how anyone could be so extravagant. You have got to live the lives of other people mentally if you are going to sell them large quantities of merchandise.

Women think nothing of buying three or four hats, or as many as a dozen, during a season, while many men never think of buying more than two hats during the year; straw for the summer and soft or stiff for the winter.

If you get out of your own environment and improve your general education regarding people you will find that there are hundreds of reasons why a man should buy four hats a year instead of two. You will find the importance of selling women a full case of canned tomatoes instead of two cans.

One of the reasons why the salesman in the average store is so far behind in his selling education work is because schools have never been established for him. Manufacturers pay little attention to him, while the average employer is always afraid he is going to ask for more money. In the more progressive stores, the employer is glad to encourage his sales people to expect more, based on their actual sales.

The salesman of the next generation is going to lift himself entirely out of the groove of present day salesmanship, and I think he will do it largely by studying his own appearance, his own language and his general intelligence. Improvement must and will come through his own efforts.

Classification of Customers

The customers today are radically different from the customers of ten years ago. We may divide them into several different classifications, along such lines as:

1. Age
2. Sex
3. General Education
4. Income
5. Temperament.

When we consider customers from the standpoint of age, we may classify them as follows:

1. Infants under seven months
2. Children from 7 months to 2 years
3. From 7 years to 14 years
4. From 14 years to 18 years
5. From 18 years to 25 years
6. From 25 years up to 45 years
7. From 45 years up.

From two to seven, the child shows some preference of its own, so that you are selling a young customer as well as the mother. From seven to fourteen, the salesman has to make two sales; one to the child, and the other to the mother. How few salesmen realize this. From fourteen to eighteen, the buying is almost all done by the young man or woman. From eighteen to twenty-five, our customers change radically, because during this period they are both buying things and doing things to please the opposite sex. From twenty-five to forty-five, you find most people married, and you have an entirely different type of customer. Every dollar must be accounted for during this period. From forty-five up, you have either very good or very poor customers. If the customer has made good, and has money, it is a very easy matter to hold his patronage. Old customers do not change about, providing you give them service.

As to sex, psychology has shown us that girls are brighter than boys up to nine or ten years. From then on, they run neck and neck, excepting in scientific study, where the boy seems to have the advantage of the girl. As they finally develop into men and women, from eighteen to twenty-five, there is no difference in their mental activity, except that women know and are more susceptible to reason-why

arguments. They shop about more. Men are in a hurry. They go in one place and buy, even though they don't see just what they want.

The income of the customer must be studied if you are to make a success of your business. The poorer sections of the town always have few telephones, so that a store in the poorer section has got to depend upon people coming and carrying away their own goods.

There is a radical difference in the temperament of customers. An Italian settlement is different from a Norwegian settlement. A Southerner is different from a close buying New Englander. But as you study customers, you find that all of them can be classified under three headings:

1. Mental type, those who think, reason, and listen to arguments.
2. The muscular type, who think, but not so much as the mental type. They are active, aggressive and make quicker decisions.
3. Vital temperament type, who are stout, well built and who do not believe in hard work. As a rule, they are sharp customers, know values, and they are good advertisers for the salesmen. More than one salesman has built up his reputation through selling fat customers. Fat people generally talk a good deal and are good word-of-mouth advertisers of anything which they like, be it food, drinks, or sales people.

In the last 15 years, selling schools organized by manufacturers have worked remarkable changes in the selling capacity of department stores, specialty shops and general stores. For the first time in the history of business, store owners have realized the importance of having service which would attract customers, and hold them.

Weakness in their selling plan for the year can almost always be traced to the poor service on the part of the salespeople.

This article is not one of the series by Prof. William A. Russell, whose next lesson will appear in the April 15th issue.

SMALL LIGHTING PLANTS POPULAR ABROAD

Compact and simply operated American electric-lighting sets for household, estate, or club installation find a good sale overseas, though just at present the demand is light, due to unfavorable conditions in the more likely markets. Gasoline and kerosene engines are the prime movers usually preferred, and storage batteries are a regular part of the equipment in most instances, especially in the case of smaller sets.

Direct-connected and belted units are both sold, the former having a more general demand. Installation conditions are such that direct-connected units probably give the most satisfactory results. Air-cooled engines have on the whole given good satisfaction, but many foreign engineers handling small lighting sets have expressed a general preference for water-cooling. Plant capacities range from $\frac{3}{4}$ kilowatts to 5 kilowatts, with growing call for somewhat larger sets, and in some instances a demand for $\frac{1}{2}$ -kilowatt units for household installation.

The voltage most commonly employed in the past has been 32 volts, but the success of individual lighting installations has led to their use in classes of work where this voltage is hardly sufficient, and 110-volt equipment is frequently called for.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Electrical Steam Generator Has Possibilities in the West

An electric steam generator, utilizing the principle of heating produced by resistance to flow of electric current through water, especially applicable to the West, has recently been placed on the market by the Electric Furnace Construction Co., Philadelphia. It is called the "Electro" steam generator.

Steam is generated at any specified pressure by means of high tension alternating current led directly through electrodes of special design into the water to be evaporated. A vertical tank is used, constructed according to approved boiler practice. The whole apparatus occupies only a fraction of the space required for fuel fired boilers and the cost of installation is very much less.

The amount of steam generated, the pressure and amount of electric power used are governed by the height of water in the vertical tank. This is controlled and regulated by standard valves, rendering the whole operation practically automatic.

Any water that is suitable for the ordinary boiler is satisfactory and it is not necessary to install water-softening apparatus. Either condensate or raw water can be used or a mixture of the two. No part of the steam generator is exposed to a higher temperature than that of the steam, and the only part subject to slight wear is the electrodes, which may be replaced annually at a nominal cost. There is no scaling or erosion of tubes or shell due to high temperatures.

The most important application of the "Electro" steam generator will be found in industries located within the range of hydroelectric power plants, where use may be made of surplus energy or water running to waste. Due to the inability of ordinary power consumers to operate 24 hours per day, the load factor at most power plants runs from 60 to 80 per cent. Complete use may be made of this off-peak load, which is not now used, by the installation of this type of steam generator, and the load factor of the power station can be considerably improved. The generators operate with 98 per cent thermal efficiency and unity power factor. It is very flexible and it can be paralleled in with existing coal or oil-fired boilers and just operated on these off-peak loads—when cheap power can be had. One large installation operates only on Saturday night and Sunday, and the resultant saving in coal paid for the whole cost in one season. In some cases hydroelectric power companies are taking advantage of their surplus power and install such steam generators in

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

central locations and distribute steam to a number of nearby industries, selling steam at a fixed rate per 1000 lb. In other cases, where an individual customer is a large user of steam, the power company has installed the generator in the customer's plant.

The chief advantages claimed for such a steam generator are that the initial and operating costs are very much lower than on oil-fired boilers, the space occupied is much less, there are no expensive buildings, smoke stacks, storage for oil or coal, no fuel or ash handling equipment, no mechanical stoking devices or water softeners.

A number of large generators have been in successful operation for some months and already over 100,000 kilowatts of generators, representing 10,000 boiler horsepower, are running or being installed of the type here described.

Automatic Station Control Meets Increased Load Demand

A progressive step to meet an increased demand for electric power for general lighting and industrial use has been taken by the Ontario Power Company, Ontario, Cal., by the decision to install a remote control automatic water wheel equipment at a new hydroelectric power station on its system.

The company engages primarily in irrigation work, but by combining the flow of water for this purpose with generating apparatus it has been able both to regulate the flow in accordance with the irrigation requirements and create additional electric energy as a by-product.

This power is sold direct to the consumer in the company's territory or in case of a surplus, is disposed of to other companies serving more remote sections.

The water wheel in the new station will be controlled from the company's main station two miles distant, by a switch actuating a set of contactors

which control the motor operated needle valves in the water wheel nozzles. This serves to regulate the amount of water which is allowed to flow through the water wheel at any time.

This is the second installation of its kind on the company's system. In 1919 power house No. 2 was equipped for similar automatic operation. The new equipment, which has been ordered of the General Electric Company, consists of a 2300-volt, 400-kva. generator driven by a Pelton water wheel with a direct connected 12-kw., 125-v. exciter, and automatic control apparatus as explained above.

Increasing the Efficiency of the Purchasing Department

Telephone conversations to members of the purchasing department from employers with whom requisitions originate have been simplified by the Utah Power and Light Company to such a degree that an inestimable amount of time and money has been saved by the application of a simple procedure in making out purchase orders.

All purchasing department orders were numbered and carbon copies were sent to employees and other company members who might be interested in the purchase, thus automatically advising them of the placing of the order, the purchase price and the promised date of delivery. If written or telephone communications later developed, the order number was referred to, but considerable delay and confusion resulted in attempting to refer to the particular purchasing department employee with whom the order originated, and therefore best qualified to give information regarding it. As the department handles from twenty to thirty thousand orders per annum it can be readily seen that any procedure which might solve this difficulty would be a great time and money saver, as well as increase the efficiency of the department. When heavy construction was in progress and calls coming in from all parts of the thousand miles of private telephone lines operated by the company, the confusion at times threatened to disrupt the purchasing department.

The difficulty was finally solved by simply placing the initial of the last name of the person who made out the order after the order number. Ninety-five per cent of the difficulty has been eliminated. All employees are advised when calling regarding an order to ask for the purchasing department employee whose initial appears after the order number.

A. D. SMITH.

Utah Power and Light Co.

The Eight-Hour versus the Twelve-Hour Shift

Results of a Nationwide Survey by the Federated Engineering Societies Shows Shorter Shift Is Most Efficient

More than 500,000 shift workers are employed in American industries, according to a report of the Committee on Work Periods in Continuous Industries of the American Engineering Council of the Federated American Engineering Societies made public recently.

Chairman H. E. Howe of the National Research Council said that the conclusions of the committee are based on a nationwide survey of "an unexplored field" conducted under the direction of Dr. Horace B. Drury, formerly of the faculty of the Ohio State University. The survey is now complete with the exception of certain regions of the South and far West.

Labor efficiency, it is indicated, is higher with three shifts of eight hours each, than with two twelve-hour shifts. Continuous operation, according to the engineers, was found to constitute a great social and industrial problem about which almost nothing is known either by labor, the employe or the public.

"While the committee plans a further engineering study in the steel industry," says the report, "its investigations to date have been in industries other than steel. It has been found that the extent of continuous-operation industry outside of steel is greater than had been supposed. There are well up to 40 or 50 industries which involve a greater or smaller amount of continuous operation, in all or a portion of the country's plants.

"These industries include many that are technically of great importance. In fact, as a class, they underlie a large portion of present day industry, many if not most materials having at some point to undergo continuous-operation processes or services.

"Four chief causes of continuous operation may be distinguished. One group is made up of what may be called heat-process industries, these industries falling into two main subdivisions, the

metallurgical and the ceramic. Another group is made up of chemical industries, though many of the industries in other groups are also to a large extent chemical industries. A third great cause of continuous operation might be termed heavy equipment or elaborate equipment. This cause operated to a greater or less extent in the case of almost all the continuous industries. It is a chief cause of continuous operation. Group four is made up of public service industries.

"In most of the continuous industries the number of employes engaged on shift work is not as large as might be supposed, because continuous operation usually comes at a stage where it is possible for a few men to handle a large tonnage of materials. The extreme example of this is in the water supply of New York, where some 300 men on shift work, daily pump some four or five hundred million gallons of water.

"Nevertheless, there are so many of these continuous industries, and many of them are of such substantial size, that, taken all together, the great steel industry probably does not account for more than a fourth or fifth of the total of shift workers. Some of the larger industries, outside of steel, are now predominantly on eight-hour shifts; but all except a few of the industries still have some plants on twelve-hour shifts; and in some cases all or a majority of the plants are on twelve-hour shifts.

"Very roughly, the number of shift workers in the United States is probably well over 500,000, though likely not as large as 1,000,000. And the number of men on twelve-hour shifts, in the period preceding the depression, was perhaps not far from 300,000, of which about as many were outside the steel industry as in the steel industry.

"The committee has been endeavoring to chart what is practically an unexplored field. Though the continuous industries other than steel present an important problem in operation to their

managers and an important social problem to the public, the extent and even the existence of this problem has practically escaped notice. The managers of continuous plants and others interested in the industries, usually know little of the situation outside of their own plant, or the very few plants that have come to their attention. Employers have come to their attention.

"It has been found that the results which have followed the substitution, say of three shifts for two shifts, have varied enormously from plant to plant. Probably in most of the plants which have changed in the last few years from two shifts to three, efficiency was not greatly improved; but to a large extent this was due to the unsettled and unfavorable labor conditions which prevailed down to a recent date. Even so, the increase in cost due to three shifts has apparently not been large enough to be a serious handicap in competition.

"Three-shift plants have maintained themselves in the same markets with two-shift plants. And even during the very serious depression of 1920 and 1921, and the strong temptation and tendency to link reduced wage rates with lengthened hours, very few plants have gone back from eight-hour to twelve-hour shifts.

"There have been instances in all types of continuous industries of companies which have gone to three shifts with striking gains in efficiency, either through reductions in the number of men required per shift, or through increase in output, or through heightened efficiency in other ways.

"Taking the continuous plants as a whole, the long run as opposed to the immediate effect of going to three shifts will probably be a substantial increase in labor efficiency; but not so great an increase in efficiency—barring exceptional plants—as to permit the paying of as high weekly wages as men would receive for twelve-hour work, without increasing cost. But it would be possible, without increasing costs, to pay the men a weekly wage which, once they had become used to the eight-hour shift, they would much prefer to the alternative of a twelve-hour day and twelve-hour wage."



ELECTRICITY AND THE MAKING OF INDUSTRIAL MOTION PICTURES

Large industries are realizing the importance of educational motion pictures as a means of publicity and advertising. More and more large firms are realizing the value of such a procedure. The two views above

show operatives from the Rothacker Film Company of Chicago taking pictures in a large industrial plant, as well as illustrating the use to which electricity is put in the making of these pictures.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

The Electrical Industry and the Radiophone Boom

A Discussion of this Latest Electrical Development with the Merchandising Problems It Has Brought

By H. C. HOPKINS

Dolman & Hopkins, San Francisco

Like an oil boom or a gold rush there has swept over the country almost overnight an unprecedented avalanche of interest in the radio telephone. Prior to last November, it is estimated that there were approximately 30,000 bona fide radio enthusiasts in the United States. Secretary of Commerce Herbert C. Hoover in a recent conference in Washington, estimated the present number of radio fans to be 600,000, with the total increasing at a remarkable rate.

And like an oil boom or a gold rush, the present demand for radio apparatus threatens to get beyond the control of the present manufacturing and distributing agencies unless immediate steps are taken. Organization and stabilization in this branch of the electrical industry are woefully lacking. Without organization and stabilization, this same electrical industry is placing itself in a position to lose, not only the credit for the inception of the radiophone boom, but also a greater proportion of the profits which justly belong to it. The manufacturer, the jobber and the dealer are not looking toward the future, but are vieing with each other to reap the immediate harvest of profits. Manufacturers report orders far in excess of production and are enlarging their plants. Jobbers cannot fill their orders. The dealers' shelves are empty and the public is still clamoring for apparatus. The solution of the problem can be found in the one word which has constantly been called to the attention of the electrical industry,—cooperation.

If stabilization and organization are to be brought out of the present chaos, manufacturer, jobber and dealer must be made to realize the various phases of the problem vitally affecting themselves.

The present tremendous demand has been created primarily by the broadcasting activities of the various manufacturers. But these broadcasting activities have exceeded the expectations of the most optimistic. At the present time, not only the various manufacturers, but jobbers, dealers, department stores and newspapers have entered the broadcasting field. In the various cities of the Pacific Coast there are no less than five broadcasting stations to each of the larger communities. Time has been allotted so that the radio enthusiast may pick out of the air almost any type of entertainment, ranging from sermons and religious music on Sundays

to weather reports, news, dance music and stories for the kiddies.

The work done by the broadcasting stations in the past has been highly commendable but the time is ripe for a housecleaning. And it is the duty of the manufacturer, who is largely responsible for the present boom, to be the first one to pick up the broom. The radio fan is beginning to tire of the cheap brand of "canned" music which is being served to him. No type of radio apparatus can eliminate the imperfections of the phonograph, so why continue to broadcast noisy, scratchy, squawky music? With the facilities at their command the manufacturers might well afford to broadcast perfect concerts by well known artists. The educational possibilities of the radio phone are admitted to be almost limitless. Then why not send out interesting lectures on vital topics by well known public speakers? A diversion from the present meaningless program could be brought about if even the politician were allowed to talk. The properly conducted broadcasting station offers immense possibilities for the future. It can be used to educate as well as to entertain and should be so used. Moreover it is the duty of the manufacturer of radio equipment to be the first to recognize the present imperfections and institute a change.

The distribution of radio equipment should by all means follow through the natural electrical channel, i.e., from manufacturer to jobber to dealer to consumer. The methods of distribution to date have been woefully lax. There has been none of the cooperation of the various agencies which has marked the distribution of other types of electrical apparatus. It should be the function of the manufacturer to create a demand for his product in this line the same as in any other, by consumer advertising in magazines and newspapers. In the case of the large manufacturers, this is especially true. There is also considerable room for improvement in the quantity and quality of dealer helps. Window cards and display material have been conspicuous by their absence. The dealer has paid considerable attention to window and counter displays but up to the present time he has received little or no assistance from the manufacturer or the jobber. The small manufacturer has in many instances spent considerable time and money in the development of his distributors. It re-

mains for the larger manufacturers to follow along the same lines.

The electrical dealer must also do his share in the cooperative movement which is highly essential if the present radio boom is to be stabilized and organized. A similar condition exists in the radio field as existed in the electrical field some three or four years ago. Dealers are failing to realize that by working together they can make each other stronger. The opinion among them seems to be that they are in business to cut prices and create war on their competitors. The dealer also faces the problem of convincing the manufacturers that they are not allowing him a sufficient discount, that he cannot conduct a modern store on a discount of 15 or 20 per cent.

The time is near at hand when the manufacturer of radio equipment will have enlarged his factories to a point where he can take care of the demand for such equipment. Consequently now is the time for the electrical dealer to prepare for the seller's market which is ahead by applying the same modern merchandising methods to radio equipment that have been applied to electrical appliances with such success.

With the assistance which is being given gratis to the seller of radio apparatus in both magazines and newspapers, with an unparalleled demand, apparently unabating, a new and important phase of the electrical business is rapidly being developed. Let the manufacturer, the jobber and the dealer cooperate to the fullest extent if the ultimate benefits to be derived from this latest development are to be obtained.

Stickers on Monthly Bills Aid in Sale of Appliances

The Bend Water Light and Power Company of Bend, Ore., which claims for its city the largest per capita use of electricity of any community in the country, has adopted a novel set of stickers which are attached to the monthly bills for increasing the use of electricity and the sale of electric appliances by planting the germ of desire in the customer's mind.

Here are three examples of the stickers used:

Do You Know that your bill would be only 25 cents per month more if you used a Vacuum Cleaner every day? We will put a vacuum cleaner in your home for \$10.00 down and \$5.00 per month.

Do You Know that for 12 cents a day you can do all the cooking for a family of five on an Electric Range? Clean and sanitary, no ashes, no dirt. For a small payment down we will put an electric range in your home.

Do You Know that your bill would be only 15 cents per month more if you used an Electric Washing Machine every wash day? We will put a washing machine in your home for \$10.00 down, the balance in nine equal monthly installments.



The JOURNAL'S RADIO PAGE - NEWS and MUSIC of the

EASY TO ENJOY THE RADIO

Music, Bedtime Stories, Market News for All; Popularity Grows in San Francisco



TODAY'S PROGRAM

The program which the great intelligence will cast at the radio telephone is as follows:

- 5:30 to 6:00 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:00 to 6:30 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:30 to 7:00 p. m. - States public health bulletins, news bulletins, and a special concert.

RADIO RADIATIONS

By FRED WOODWARD

Every day more and more the radiophone is being used in hospitals for the purpose of providing absolutely the best and most reliable means of communication for the patient.

LESSONS IN RADIO COMMUNICATION

By EDWARD N. DAVIS

Formerly Technical Electrical Expert for the United States Government

Short Flashes FROM AERIALS

The Pioneer Clearing House will be the father of wireless telegraphy in the future.

NEED OF GOOD AERIAL

If you have not a good aerial and your ground connections are defective, you cannot expect to be able to pick up much with ten or fifteen feet of wire hanging near to the earth like a clothesline.

COAST DANCES TO MUSIC BY RADIO

What was at first planned for a small number of radio stations has now become a great success.

OPERA STARS WILL SING SELECTIONS FOR RADIO

Two stars of the San Carlo Opera Company, which opens at the Metropolitan Opera House on Monday, will sing selections from the opera "The Barber of Seville."

RADIO PROGRAM IN SIX PERIODS

This program which the Post-Intelligencer will broadcast over the radio telephone today is as follows:

- 5:30 to 6:00 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:00 to 6:30 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:30 to 7:00 p. m. - States public health bulletins, news bulletins, and a special concert.

FAMOUS VIOLINIST PLAYS FOR RADIO

For efficiency the violin is connected to the broadcasting station. This is if the transmitting station is to the west of the receiving station the aerial should be hung from east to west with the end at the western end. If there

BELL-LIKE VOICE

MISS IRENE SPENCER

RADIO VOCALIST HAS FINE VOICE

PROGRAM FOR RADIO GIVEN

The program which the Post-Intelligencer will broadcast over the radio telephone today is as follows:

- 5:30 to 6:00 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:00 to 6:30 p. m. - States public health bulletins, news bulletins, and a special concert.
- 6:30 to 7:00 p. m. - States public health bulletins, news bulletins, and a special concert.

BEE'S SERVICE BY RADIO BRINGS NEW STATIONS

Amateur Report Success of Sets Installed at Nominal Cost. Many Have Music With Them Now; Utah Hears in Storm

MISS PARLOW PLAYS OVER RADIO

BY MARY ELLEN CAPRE

An acoustic violin, the most delicate of instruments, has been brought to the attention of a letter received by the Atlantic-Pacific Radio Supply Company from Yakima, Wash., under date of March 1, 1927.

YAKIMA HEARS S. F.

The excellence of equipment and aid yesterday, "and are backed up by the solid cash of given orders if municipal installation, it is felt that this pipe be continued as the center of the line pipe in the future of the West, it is expected."

VOICES FROM PAST TO SING ON RADIO TONIGHT

Post-Intelligencer Concert Program to Include Victor Records of Singers Now Dead

VARIETY MARKS RADIO NUMBERS

Radio enthusiasts in all parts of the Pacific Northwest are being entertained tonight by the Post-Intelligencer's variety program.

FURNISH CONCERT FOR RADIO

The silver voiced young woman, who is a part of the Post-Intelligencer's variety program, is Miss Violet McKay Ball.

Special Post Radio News Service to Begin Monday Night, With Concert by Wireless Preceding the Outstanding News of Day Throughout World.

(By W. L. WYNNER JR.) (Denver Post Radio Editor.)

Wireless Instruction Course

Arranged for the Layman By S. GERNSBACH

The first installment of this course was published last week. Each copy of the edition may be had at this office.

CURRENT GALVANIC ELECTRICITY

The most successful machine of the type illustrated herewith, Fig. 1, is the influence static machine, which is used in the treatment of various diseases.

MUSIC BY RADIO HEARD AT BANQUET

Theater Program Sent to Luncheon Meeting of the Electric Club.

Radio Is Heard At Rainer Club

With a radio telephone aerial, strung inside the building, the Rainer Club members and their guests at a banquet at the Rainer Club, a celebration of more than 100 members from the Club of Spokane heard the voice of the Post-Intelligencer's radio telephone.

THEATER PROGRAM SENT TO LUNCHEON MEETING OF THE ELECTRIC CLUB

For the first time in this city furnished by wireless from the Alexander Theatre, the members of the "Electric Club" at the Rainer Club, a celebration of more than 100 members from the Club of Spokane heard the voice of the Post-Intelligencer's radio telephone.

FURNISH CONCERT FOR RADIO

The silver voiced young woman, who is a part of the Post-Intelligencer's variety program, is Miss Violet McKay Ball.

The electrical industry has developed an entirely new phase in the unprecedented demand for radio telephone equipment which has grown up within the past six months. The expectations of its most optimistic members have been exceeded. The above cut gives an idea of the amount of advertising which is being given to this branch of the industry in the daily press.

The clippings were taken from papers in Los Angeles, San Francisco, Sacramento, Butte, Denver, Seattle and Portland. Many of the newspapers are devoting an entire page to the subject. Is the electrical industry taking advantage of this publicity? Through organization and cooperation immense benefits will accrue from this publicity.

Selling Electric Light As An Advertising Medium

Some of the Reasons Why the Contractor-Dealer Need Not Fear
a Decline in His Electric Sign Business

WHATEVER may be said of the slackness in other lighting lines, it is a fact that there is no slump in the electric lighting display field. In almost any business, when sales fall off, the advertising manager says, "Now is the time to advertise harder than ever" and the powers that be may agree with him, but they end up by saying, "Cut down on your advertising expense" and when they do, there's nothing to it but to cut and the advertising manager begins by lopping off at the points where he figures the curtailment will hurt least. But, electric signs have not been darkened nor torn down. In fact, new signs pop up like mushrooms with every passing day. It is all positive proof that the merchant or manufacturer considers display lighting as one of the most profitable and vital forms of advertising—something he simply cannot afford to curtail no matter how hard pressed for dollars he may be.

At a recent annual convention of the Associated Advertising Clubs of the Pacific Coast, the following analysis of the average business done by the retail merchant following the installation of an electric sign, was given:

Normal business before sign purchase, 100%.
First month after sign purchase, 162%.
Second month after sign purchase, 174%.
Third month after sign purchase, 180%.
Fourth month after sign purchase, 178%.

It is possible, of course, that other conditions have had a share in creating these considerable increases in business, but the conclusion is inevitable that the electric sign has been the primary sales builder.

Another point in connection with these figures is that upstairs or second floor stores follow right along with similar average increases in business after the installation of electric signs and that restaurants, garages, drug stores and other establishments which remain open in the evening often derive an even more startling increase in business from electric display advertising.

No definite and average figures are available covering the results of electric sign advertising for the big manufacturers of such articles as automobiles, cigarettes, clothing and other nationally advertised products. While the sales results are possibly not quite so remarkable as for the local advertiser whose place of business is made outstanding by means of the electric sign, there can be no doubt that a very comfortable increase in sales is accomplished.

Whenever business starts to drop off, competition wakes up and sharpens its teeth. Merchants and manufacturers become more alert and anxious to find ways and means of putting their stores or products across with the buying public. If a big department store blossoms out with an electric sign, all the other department stores soon do likewise. Joe Popadalodous of the Parthenon Kandy Kitchen sees his shop fade into insignificance and hastens to rescue it with incandescence. And so the flood of light progresses down every street of merchants until each city and hamlet has its own Great White Way or maybe

several of them, differing only from the great and only Broadway in size.

Then comes the real tussle among the merchants and manufacturers who have electric signs, each striving to turn attention to his own particular sign. Colored light is called into play and flasher effects become popular. This has gone on until it seems that the possibilities for constantly new and unique flasher and color effects have been exhausted for the present or until some new genius gives them a new impetus. So, the trend in the competition for attention in the last year or two has been towards greater brilliance. The customary five and ten watt sign lamps have been supplanted by many times more powerful light sources, all the way up to 150-watt lamps. All over the country this program of brightening electric signs has been going on. In most cases such changes have been accomplished with a following increase in attention value and without loss of other valuable sign attributes. Whole districts have become brighter with a subsequent increase in business and in general traffic.

The trend for illuminated bill-boards has been constantly towards a greater intensity of illumination on the board. It has been effected by the use of higher wattage lamps and in the use of more lighting units per board.

Just as the up-and-doing salesman has found that he can sell but that he has to hustle a lot harder to do it than ever before, the aggressive merchant finds, too, that he can sell, but that he has to coax trade a lot harder than he used to do. And when it comes to coaxing trade, light is one of the merchant's strongest allies, but it requires a time like the present to make the merchant realize how powerful a force light may be.

Very fortunately, practical developments in the use of color for window lighting have recently been carried through so that any merchant may today provide himself at small cost with

lighting equipment which gives him almost complete color control of his display window. That this development is going to be a big factor in coaxing trade and that it is going to come into rapid and widespread use is a foregone conclusion.

Higher intensities of illumination for store interiors are coming more and more into favor as merchants sense the value light has in bringing people into their stores and in making actual sales easier to accomplish.

Some years ago there was a general rush among retail merchants to light up the exterior of the store with 500 and 1000-watt lamps in enclosing glass globes. This means of display has been very effective in drawing interest to the store, but because it was employed by many smaller merchants who did not realize the justifiable expense of such units as entailed by four or five hours of burning each night, a considerable number of the units were not used after the first month or two.

The lighting field has of late taken a new spurt on a more sensible basis and merchants are installing such units where they are of especial advantage in putting the small and unimpressive store in the lime light or as an added means of advertising the larger and brightly lighted store.

Over in China they have a huge river which has the habit of changing its channel whenever the fit seizes it; one day the river is here but tomorrow it may move several miles away leaving a dry groove where but a few hours before was a mighty stream.

Trade has somewhat the same characteristics. The buying public is proverbially fickle and feels no obligation to any particular merchant or manufacturer, so that an effort is always necessary to keep old customers in line and to attract new ones and that is the fundamental reason why electric display advertising is valuable and tends to become more so as competition among retailers, wholesalers and manufacturers becomes sharper. It is one of the reasons for the big demand for electric display illumination right now with a big profit opportunity to the lighting industry.



A striking example of sign illumination in the automobile district of one of the larger Western cities

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Utilities Blamed for Floods Suits in Colorado Courts Seek Damages For Pueblo Flood Disaster

Litigation of a far-reaching character, not only in the district affected, but to the entire West, growing out of the Pueblo flood last June, has been instituted in the courts of Colorado involving the Arkansas Railway, Light and Power Company and the Beaver Water and Irrigation Company in suits for heavy damages resulting from the bursting of dams and reservoirs at the flood period.

Suits for damages aggregating \$450,000 have been filed by the irrigation company against the power company for the bursting of the Shaeffer dam on Beaver Creek. New suits have been filed by property owners against the irrigation company alleging that property damage resulting from the flood was due to the bursting of the dam and that the latter was of faulty construction and improperly cared for.

In all these cases the plaintiffs allege that the Shaeffer dam broke because it was carelessly and negligently constructed and maintained. They allege that the spillway was of insufficient size and capacity and that the discharge gates were inadequate and were not fully opened during the flood period. They further contend that the dam had settled approximately two and one-half feet near the middle, thus decreasing the capacity of the spillway. It is also alleged that the dam was defective and unsafe on account of strong seepage at its eastern end and that a large crack had been permitted to develop near its western end. Further, the defendant, it is stated, negligently and wantonly permitted the spillway of the dam to become partially clogged and thus hindered the discharge gates from being fully opened.

The suits are of major importance to power companies throughout the West, where hydroelectric resources furnish most of the power.

Freight Reductions in Northwest Aid Lumber Manufacturers

Numerous freight rate reductions asked by shippers will be put into effect by the trans-continental railroads in the near future, as the result of favorable action taken at a recent meeting of traffic managers of all lines, a report on which was made recently by the officials of the interested companies.

Of particular interest to Northwest lumber manufacturers is a decision to make a proportional rate of 61c. per 100 lbs. from north Pacific Coast points to Duluth and lumber routed by rail and water points on the Great Lakes in Michigan, Ohio, Pennsylvania and New

York. The rate from Spokane to Duluth will be 58c. per 100 lbs. Another change in the lumber tariff gives the Pacific Coast shippers a rate of 75½c. per 100 lbs. to all points on the Southern Railway in Illinois. The reduction is expected to create new business. The rate from Spokane and Idaho points will be 72½c. The third change is the granting of a rate of 76c. per 100 lbs. from coast points to Gulfport, Miss., on lumber destined for export from that city. The export rate from Spokane will be 73c. A fourth change gives shooks for wire rope drums, which are now being manufactured on this coast, the regular lumber rates to eastern markets.

Idaho Mining Company Closes \$750,000 Placer Deal

The largest mining deal consummated in southern Idaho for many years has just been closed at Pocatello, whereby the Gold Dredging and Power Corporation, organized by Boise people, took over 5860 acres of rich placer lands in the central Idaho section. The company also took over the equipment of the Boston and Idaho Gold Dredging Company, including their power plant on the Payette river, as well as the Centerville Mining and Milling Company's holdings on Grimes Creek, owned by W. H. Estabrook. The transfer involves property values amounting to \$750,000.

The Gold Dredging and Power Corporation is capitalized at \$1,500,000, and is sponsored by S. K. Atkinson, Frank E. Johnesse, W. D. Bohm, L. W. Thrailkill and E. G. Eagleson.

Extension of Crater Lake Park Disapproved By Engineers

Disapproval of the plan for including Diamond Lake and surrounding territory in the Crater Lake national park on the grounds that there are great possibilities for the development of hydroelectric power in that section is voiced in a report and resolution prepared by Oregon Technical Council and the committee of the Oregon Association of Engineers. The area in question is now under the jurisdiction of the forestry department and it seems that there is strife between two government departments for control of this section, the park bureau asking that it be set aside as a national park.

Diamond Lake is the only practicable storage site for the waters of the Umpqua river, a southern Oregon stream of unusual hydroelectric possibilities yet undeveloped, and it is claimed that if the lake were to be used as a storage basin the river would be capable of a 22,000-horsepower development.

Chicago Firm to Come West

**Hurley Manufacturing Company
Will Build \$1,250,000 Factory
on Pacific Coast**

A \$1,250,000 factory for the manufacture of electrical appliances will be located on the Pacific Coast by the Hurley Machine Company of Chicago, according to Edward N. Hurley, head of the company and former head of the United States Shipping Board, who recently visited San Francisco for the purpose of inspecting a site for the new industrial plant.

The Hurley company, which manufactures a popular line of washing machines, vacuum cleaners and other appliances, has recently announced a program of expansion, which included the absorption of three Chicago firms.

According to Mr. Hurley, the new factory will be located in a Pacific Coast city having direct connection with sources of raw materials as well as ample provision for foreign trade expansion. The industrial district of South San Francisco is being seriously considered as a possibility for the location of the factory.

Preliminary plans have already been prepared for the building. The plans call for a structure having at least 100,000 square ft. of floor space. It is estimated that at least 400 men and women would be employed.

This move on the part of the Hurley interests, San Francisco industrial leaders assert, is in line with the policy which has recently been established by other large eastern manufacturers who have found a large market for their products in the West. The case of the General Electric Company, which recently purchased a large site in Oakland for the location of a branch plant, is cited by them as further proof of this tendency on the part of eastern manufacturers.

The adobe electrical home in Los Angeles, one of the finest of this type of modern homes to be constructed and displayed, was recently sold for \$35,000. While the home was being exhibited under the auspices of the California Electrical Cooperative Campaign and the Western Construction Company, its builders, it was visited by thousands.

The cereal food plant of the Albers Brothers Milling Company at Ogden, Utah, has been reopened after a shut-down of several months. Other grain and milling plants in the Intermountain district which have been operating on a small scale during the entire period of depression, have announced that they will immediately commence normal operation.

Events in Washington of Interest to Western Men

**A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry**

Shortly after April 1 the Finance Committee of the Senate expects to complete its extensive fundamental alterations of the tariff bill and recommend its adoption to the Senate. This bill has been in the hands of the Finance Committee for more than eight months. The uncertainties which have been cast over business by this delay admittedly have had a demoralizing effect, but the members of the Senate committee have felt that it was justified because of the world-wide economic instability. The bill as passed by the House when measured by the standards of American valuations, which were set up in the bill, brought an avalanche of criticism based on the fear that the rates of duty would be unprecedentedly high. While good arguments have been advanced to show that such a fear is not justified, the Senate committee has insisted on making a very deliberate study of the effects on the tariff of such fundamental changes as the United States having become a creditor nation, the depreciation of currencies and the fall in exchange.

Many of those who would like to see the Underwood rates continue are anxious to have the uncertainty ended and are urging that final action on the tariff be taken at the earliest possible time. It is very generally recognized, however, that the consideration of the tariff bill in the Senate will be long drawn out. Legislators are dealing with conditions that are entirely new and which are not understood thoroughly. As a result there are very diverse opinions as to the action which should be taken on tariff matters.

Trade Associations

Due to the questionable practices of a few trade associations all organizations of that character have been brought under suspicion with the result that many industries are on the point of abandoning this type of activity. Commerce Secretary Hoover believes this would be a decided step backward in our industrial progress and has been doing all in his power to encourage the continuance of those trade associations that are willing to confine themselves to constructive practices. He accomplished an unprecedented thing when he secured a statement from the Attorney General outlining the things trade associations may do without fear of prosecution. It seems, however, that even this is not checking the disintegration which threatens the whole fabric of trade associations. To meet this situation, Mr. Hoover has called a conference in Washington of the representatives of trade associations. This conference is to be held April 12 for the following purposes:

1. Securing a list of trade associations that will furnish voluntarily to the Department of Commerce the classes of statistical information outlined in the correspondence between the Department of Commerce and the Department of Justice, published on February 16, 1922.
2. Discussing and considering means and methods that may be best adapted for collecting and forwarding to the Secretary of Commerce, for dissemination, the classes of statistical information outlined in the correspondence re-

ferred to, including the forms of reports that will be most suitable, for associations that are willing to furnish such statistical information.

3. Discussion of the manner in which such reports of the statistical officer of the associations are to be filed with the Department of Commerce, and the manner and method of distributing the information therein to the members of the associations and to the public.

Radio Telephone Control

Tentative recommendations as to methods and policies for radio telephone control have been made by the technical committee which was appointed at the recent public hearing at which it was admitted generally that the Government would have to regulate air rights to prevent confusion and to establish the priorities necessary to the public.

The recommendations are of great length and detail. They first point out the necessity for government control of radio telephones as the only solution to the present chaos of interference; that unless there is definite regulation of all telephone transmitting stations the whole system will be destroyed by interference.

In order to accomplish this the Committee recommends that the existing powers of the Department of Commerce should be extended to complete control of transmitting stations. It does not recommend any control of receiving stations. The Committee recommends that wave lengths below 6,000 meters should in a general way be reserved for radio telephone service but that those wave lengths which have become fixed in service for telegraph service within this range, such as SOS signals, shall be retained. But it is the hope and expectation that the radio telephone may ultimately keep the whole range from zero to 6,000 meters.

The committee considers that the present development of the art warrants the separation of 20 different wave bands within this range, of which 17 lie between zero and 2,000 meters. In the assignment of these wave bands the Committee recommends that priority first be given to broadcasting service and that secondarily, broadcasting service itself should be divided into priorities in the following rotation, first Government broadcasting; second, educational and public broadcasting; third, private broadcasting including entertainment, news, etc., and fourth, toll broadcasting.

Reservation of wave lengths between 150 and 275 is made for amateurs and some opportunity in experimental wave lengths would be assigned to them in addition.

The Conference strongly recommends the extension of authority of the Government into thorough control of transmitting stations and that the radio telephone may be considered a public utility.

Freight Rates to Come Down

The consensus of opinion among traffic men in Washington is that the Interstate Commerce Commission in its forthcoming decision, in the freight rate reduction case, will authorize general reductions amounting to not less than ten per cent and reductions on basis commodities of from fifteen to twenty per cent. It is believed that the evidence submitted to the Commission establishes beyond question that reductions to that extent can be made without reducing the revenues of the carriers. In fact, there is a very widely held opinion that the reductions will result in increased revenues as the result of the stimulus of cheaper rates.

Highway Legislation

Hearings began March 15 before the Committee on Roads of the House of Representatives at which consideration was being given to the expenditures which the Federal Government is justified in making in aiding highway construction.

Apparently a majority of the committee favors the Woodruff bill which carries an appropriation of \$50,000,000 for the next fiscal year; \$65,000,000 for the fiscal year to end June 30, 1924, and \$75,000,000 for the fiscal year to end June 30, 1925. The American Association of State Highway Officials is contending for an appropriation of not less than \$75,000,000 for each of the next three fiscal years.

Manufacturers of U. S. Motors Report Increasing Business

The U. S. Electrical Manufacturing Company of Los Angeles, motor manufacturers, report that their business for 1922 thus far shows a decided increase over the corresponding period of last year. Business booked for the month of February shows orders equal to 200 per cent of those for February, 1921, making the month of February, 1922, the largest month's business in the history of the company. This company began the manufacture of motors thirteen years ago on the Pacific Coast, and has specialized in this line of manufacture during the entire time.

In order to take care of the rapidly increasing growth of their business, it is reported that the company is planning the construction of and expects to be in a new factory the latter part of the present year. The new factory will take care of the largely increased demand, and be of the most modern construction.

In order to secure the advantage of the latest type construction in factory buildings, the owners of the business, H. G. Steel, president, and C. E. Johnson, vice-president, are going to spend thirty days on an eastern trip, studying various types of factory construction. They expect to leave for the East during the month of May.

California Cities Contribute to Boulder Canyon Survey

The United States Reclamation Service has been making engineering investigations of the Boulder Canyon dam site on the Colorado River. The funds for this purpose are now exhausted and the cities of Pasadena, Long Beach, and Los Angeles are proposing to appropriate funds for the purpose of assisting the engineers in continuing this investigation until other money is available. As a result of recommendations made by City Manager Koiner of Pasadena, the Board of Directors of that city have appropriated \$5,000 toward such a fund. It is said that Long Beach and Los Angeles have signified their intention of also appropriating similar amounts for the same purpose. The statement is made that this money is in the nature of a loan and will be repaid from Congressional appropriations.

The Seimens-Shuckert Company, a German syndicate, is reported to have completed a contract with the Chilean government for the erection of eleven radio stations in Chile. The proposed stations would range from two to five kilowatts in capacity and would cost approximately \$500,000. They would be of the Telefunken continuous wave type rather than the Marconi type.

Commission Seeks Solution of Colorado Problem

Many Arguments Presented at Meetings Held in Phoenix and Los Angeles in Effort to Expedite Development of River

The immediate construction of the Boulder Canyon dam for the protection from floods of the irrigated lands in Arizona and the Imperial valley, with the added clause that the seven states comprising the Colorado basin enter into a twenty-year litigation holiday with water rights remaining as they are at the present time, is the outstanding suggestion brought forward during the sessions of the Colorado River Commission which have been held in Phoenix and Los Angeles.

Meanwhile Secretary of Commerce Hoover and the members of the commission have visited and inspected the site of the proposed dam which various groups have recommended that the government construct, and have visited the Imperial Valley for the purpose of determining how pressing the flood menace is at the present time.

Speakers from all of the districts which will be affected by the development of the river have agreed that irrigation interests should supersede power plans while many have contended that flood control should take preference over both of the above.

The meetings are being held primarily for the purpose of working out a feasible plan for the development of the river before making a report to Congress. Hearings in each of the sections affected are being held so that the commission might have the benefit of suggestions or criticisms from individuals or organizations interested in the development of the river.

So far no definite agreement has been reached owing to the wide divergence of opinion over the matter of states rights, each of the many states claiming to have prior rights to the use of the water. Wyoming, Utah and Colorado form one group which is contending that Arizona and California, if given the opportunity, would prevent any use of the water in the northernmost states of the basin. Arizona, Utah and New Mexico are seeking water for power and irrigation development, while California is asking primarily for flood control.

Speakers from Southern California proposed to the members that California would forego all claims to water rights provided immediate and ample flood control was assured for the Imperial Valley.

One of the most reasonable solutions for the entire problem, certain members of the commission contend, is that offered by John Hoyt, hydraulic engineer in charge of the distribution of surface waters for the U. S. Geological Survey, who presented an analysis of the situation from the point of view of a disinterested government bureau.

A study, he said, indicates that three distinct problems must be considered—one relating to irrigation in Colorado, Wyoming and Utah, where the head-water tributaries of the Colorado contribute more than 90 per cent of the total flow; another relating to power and irrigation in New Mexico, Arizona and Nevada, and a third relating to irrigation in California.

He asserted that it is the belief that all interests will be fully protected by an agreement that at least 65 per cent of the present flow of the river shall reach the canyon section and that no rights for power or irrigation shall be created in or below the canyon that will deprive the states of Colorado, Wyoming and Utah of a right to consume 35 per cent of the present flow above the canyon. He added that this allotment should apply for fifty years.

Mr. Hoyt's statement showing the physical and other conditions bearing on the problem of utilizing the water of the Colorado River as follows:

The following table shows the distribution of the drainage area among the seven states and Mexico and the average annual contribution from each to the total flow of the stream.

State	Drainage Area		Flow	
	Sq. mi.	Pct.	Acre-feet	Pct.
Wyoming	18,000	7.2	2,300,000	12.5
Colorado	39,000	15.5	11,800,000	64.1
Utah	40,000	15.9	2,300,000	12.5
New Mexico	23,000	9.2	1,260,000	6.8
Arizona	113,000	45.0	740,000	4.0
Nevada	12,000	4.8	Negligible	
California	4,000	1.6	Negligible	
Mexico	2,000	.8	Negligible	

As the Journal of Electricity and Western Industry goes to press, Secretary Hoover and his commission are holding hearings in Salt Lake City and Denver for the purpose of gathering further expressions of opinion regarding the recommendation which the commission shall make to Congress. Reports of these meetings will appear in the next issue of this publication.

Van Camp Packing Co. Purchases California Canneries

The Van Camp Packing Company, one of the largest packers of food products in America, has completed negotiations for the acquisition of four canning plants in California, according to an announcement made by W. B. Campbell, president of the firm, following a visit to San Francisco.

In entering the California canning field, the company will purchase outright plants in San Francisco, San Jose, and Reedley and will lease a fourth plant at Oroville. It is understood that \$4,000,000 was required to finance these deals.

During the fruit season, the Van Camp interests will pack peaches, pears, cherries and other fruits, and between seasons will pack other standard Van Camp products, of which there are more than fifty.

The decision to enter California was brought about by the desire to add canned fruit to the present line of Van Camp products as well as to make a saving by supplying Pacific Coast and export markets with the other Van Camp products direct from packing plants on this coast instead of paying the high freight rates from eastern centers.

Plans for enlarging the plant of the Tamal Packing Company in San Francisco to four times its present capacity have already been announced. Officials of the company declare that \$1,000,000 will be spent remodeling and equipping this plant for the 1922 fruit season.

Report Progress on Skagit River Power House Plans

Plans for the concrete and steel Skagit River power house to be built as a part of the Skagit River power development project by the city of Seattle are progressing rapidly in the offices of Hydroelectric Engineer C. F. Uhden in the Alaska Building. Construction work will be started about June 1, it is believed.

Specifications call for a building 160 by 90 ft. in size, and 112 ft. in height, with three floors. It is hoped to complete construction work to permit of machinery being installed before the end of the present year. Two huge generators, with their water wheels are to be installed this year, and another generator at a later date. In addition, six transformers will be housed in the new power house, and around the generators a crane way to accommodate a 150-ton electric traveling crane with a clear span of 45 feet is to be erected.

Plans, specifications and proposals for contractors for switchboard equipment for this plant were recently approved by the Board of Public Works, and bids for the switchboard, switchboard instruments and switches, will be opened on April 14 by the Board of Public Works.

Mountain States Power Co. Buys Oregon Utility Properties

It is reported that the Mountain States Power Company has purchased the properties of the Cottage Grove (Ore.) Electric Company from the owners, C. M. Shinn and O. M. Kem. It is the plan of the new owners to operate the steam plant at Cottage Grove until such time as an 11,000-volt line can be constructed to connect with the company's plant at Springfield which will be the terminus of the 110,000-volt line being built by the California Oregon Power Company. The Cottage Grove plant has been in operation for 12 years and has a large patronage. The Mountain States Company believes that the business can be developed and that many of the sawmills and planing mills in that district will use electric power in the future.

L. A. McArthur, general manager of the Pacific Power and Light Company, of Portland, Oregon, in a recent interview with a representative of the Journal of Electricity and Western Industry in San Francisco, stated that his company since January 16th has disposed of 701 shares of their 7% preferred stock. The campaign is now under way in which 28 different employe teams have been organized. The campaign will end in April and prizes will at that time be awarded to those who have put over the most effective service in sales of stock.

An interruption to electric service from an unusual cause recently occurred in Hood River, Ore. Beavers busily engaged in laying out their homestead very carelessly felled a tree through one of the transmission lines of the Pacific Power and Light Company, throwing the Parkdale district out of service for one night and causing a disturbance to service in Hood River.

Government Installs Electric Ovens at San Diego Base

The experience of the Government with electric cooking equipment on board battle ships has been so satisfactory that electric bake ovens were selected as the baking equipment for the three million dollar home of the U. S. Marines at San Diego.

The new base is situated on a tide-lands site, donated to the Government by the city. The present buildings are of sufficient capacity to house one thousand men. This base is thoroughly equipped and up-to-date in every respect.

The baking for all the men is done at a model bakery having a capacity of 1200 loaves per day. Flour is dumped into a giant hopper where it is sifted to remove any possible foreign matter that it might contain. The flour then passes to the mixer where it is automatically weighed, measured, mixed and heated to the required temperature. After the dough has raised for about six hours, it is cut to the required size, kneaded and dumped into the pans by machines.

This bakery is equipped with two electric ovens, each having a capacity of 240 one-pound loaves of bread, and consuming a maximum of 35 kilowatts. The ovens are of the stationary type, built of brick under the supervision of the manufacturer. They are equipped with steam connections and mercurial thermometers, so that the temperature can be accurately gaged and the heating elements are above and below each deck. The whole shelf is used efficiently by means of the wide doors and the three-heat control switches enable the operator to control perfectly the baking temperature. The appearance of the glazed white brick of the oven exterior is in keeping with the quality of the product of the oven. As there is no combustion, flame, fumes or soot, this type of equipment is indeed ideal for the model bakery.

The Marine Base ovens, together with the one recently placed in commission at Camp Kearny, make a total of 23 ovens served by the San Diego Consolidated Gas and Electric Company. Many of these ovens have superseded others using various kinds of fuel. It has been found that the many advantages incident to the use of electricity for fuel make them very satisfactory.

The cost of electricity per heat unit is greater even when a special rate is offered, than most of the competing fuels. It has been found, however, that the efficiency of utilization of the electric oven is greater, due to the accuracy of control and the heavy heat insulation. The result is that the cost of operation of the electric ovens compares favorably with other types of fuels for other than bread baking.

Approval of Columbia Basin Plans Expected From Goethals

The feasibility of the Columbia River basin irrigation project, it is believed by those in touch with the situation in the Northwest, will be affirmed by General George W. Goethals when he makes his final report on the results of the investigation which he has just concluded. His report when compiled a few weeks hence will be made to Dan A. Scott, state director of reclamation. To members of the Tacoma Commercial Club, who sat with him at a dinner given in his honor recently, he painted a word picture of the vast area within the limits of the project at that future time when it will have been brought under water, and when he envisioned the entire district happily populated and the whole area blooming and fertile under the touch of water, he left no doubt of his belief that the thing can be done.

Applications have been filed with the public service commission of Wyoming for the construction of a pipe line from Carbon county, Wyoming, to Denver, for the purpose of supplying the latter city with natural gas from the Mahoney Dome oil fields. The plan of bringing natural gas to Denver was proposed last December and since that time negotiations have been in progress for perfecting the scheme.

A three-sided controversy over the use of the waters of the Truckee River has developed between the state of Nevada, the United States Reclamation Service and the Nevada Valleys Power Company. The reclamation service has refused to proceed with the Newlands irrigation project unless the state revokes the power rights granted to the power company by the state in 1911. The power company is contemplating the erection of a plant on the site at Vista, Nevada.

\$3,500,000 Equipment Contracts Let By California Utility

Contracts totaling approximately \$3,500,000 have just been let by the Southern California Edison Company covering complete generating equipment and auxiliary apparatus for a 75,000-kw. hydroelectric station, an additional 16,000-kw. generator in a present hydroelectric station, and miscellaneous apparatus for several substations and for converting the present 150,000-volt Big Creek lines to 220,000 volts.

This apparatus is to be used in a new station, Big Creek No. 3, in Big Creek No. 1, in stations on the Big Creek transmission lines and in terminal substations on these lines. For Big Creek No. 3 three 25,000-kw. generators have been purchased which will be driven by single 35,000-hp., 935-ft. head reaction turbines. The generators will operate at 10,000 volts and will be connected to the 220,000-volt transmission lines through seven 18,500-kva. transformers. Three welded penstocks 1375 ft. long ranging in diameter from 7 ft. to 6 ft. will be installed. In Big Creek No. 1 an additional 16,000-kw. generator will be installed driven by a double overhung impulse wheel rated at 22,500 hp. An additional penstock 4370 ft. long ranging in size from 42 in. to 26 in. in diameter will be installed at this station. For Big Creek No. 1 and No. 2 and for a substation on the Big Creek transmission line there have been ordered eighteen 17,500-kva. auto-transformers for 150,000 to 220,000-volt service. For installation at Eagle Rock terminal substation on the Big Creek lines there have been ordered six 36,700-kva. auto-transformers for the same voltage. This apparatus, together with thirty-two 220,000-volt oil switches rated at 3500 arc-amperes, will be used in converting the present 150,000-volt double circuit Big Creek transmission lines to 220,000-volt operation.

An additional terminal substation for the Big Creek lines will be constructed and part of the apparatus for it was included in these contracts. Included are a 30,000-kva. synchronous condenser, seven 20,000-kva., 220,000 to 60,000-volt transformers, and four 10,000-kva., 60,000 to 6600-volt transformers. This station will be partly constructed this year and completed next year.

The first two units in Big Creek No. 3 and the additional unit in Big Creek No. 1 will be placed in operation in the spring of 1923 at which time it is planned to have the Big Creek transmission lines converted and reinsulated for operation at 220,000 volts. The third unit in Big Creek No. 3 will be placed in operation early in 1924 and will complete this station to one-half its ultimate capacity.

The impulse wheel in Big Creek No. 1 will be supplied by the Allis-Chalmers Company; the reaction turbines in Big Creek No. 3 by the Wellman-Seaver-Morgan Company; the penstocks by the Kellogg Company; the electrical equipment for Big Creek No. 3 by the Westinghouse Electric and Manufacturing Company; and the other equipment ordered will be supplied by the General Electric Company.



Two 35-kw. electric bake ovens which have been installed in the three million dollar Marine base at San Diego by the government. The San Diego Consolidated Gas and Electric Company has 23 such ovens on its lines at the present time, showing that the popularity of this type of equipment is constantly increasing.

Will Illuminate 12-Mile Highway in Southern California

Recognizing the commercial, safety and esthetic values of good boulevard lighting the citizens of Santa Monica, Sawtelle, Beverly Hills, Los Angeles, and the residents of the country between these cities are uniting in a plan for the installation of ornamental standards on Santa Monica Boulevard from end to end, a distance of 12 miles.

It is proposed to have the entire installation uniform in design, expense to be borne by the different sections traversed by the drive. Many accidents have occurred during the 10 months' period each year when pleasure traffic frequently reaches the enormous total of 16,000 to 18,000 vehicles between the hours of 8 a.m. and 11 p.m. daily. Inasmuch as the boulevard follows residence territory throughout its entire length it is anticipated that all interests will agree to the installation of the latest and most approved form of boulevard lighting units.

Yosemite Valley Has Wireless Communication System

Successful operation of wireless telegraph and telephone stations in Yosemite Valley, California, has been accomplished. After several weeks of experiment, results are so satisfactory that announcement was recently authorized that wireless henceforth will be a permanent method of communication with the popular resort, though it may not be open for commercial use until next winter.

Edwin J. Symmes, of Alameda, architect for a hotel company operating in Yosemite National Park, put in the first wireless set for his own amusement and has received messages from several score damped and undamped wave stations, including Honolulu and Catalina Island. Government authorities also have put in a station, which will be used to keep in touch with the outside world when state-wide storms interfere with wire communication and in touch with Glacier Point, now open to visitors throughout the year, which is 3254 feet sheer above Yosemite Valley.

Because Yosemite Valley is literally a "hole in the ground" several wireless experts declared local conditions were entirely against successful operation of a wireless station there. Yosemite's granite cliffs rise straight into the air for 3,000, 4,000 and 5,000 feet. Nevertheless, the Valley folk have been getting news reports, weather predictions, market quotations, and good music right out of the air, with no other aerial than wires strung between two of the giant trees with which the valley floor is forested.

The Tokyo Underground Railway in the Japanese capital is preparing to begin excavations on a ten-mile subway through the heart of the city. The system will cost approximately 35,000,000 yen or \$17,500,000.

Pupils of the Myrtle Hill School in Denver have perfected a pageant showing the evolution of lighting from the time of the cave man to the present day electric bulb. The pageant is being shown before various school organizations as well as civic and commercial clubs.

Company Secures Terminal For Its Electric Ferries at S. F.

Final arrangements have been made between the Golden Gate Ferry Company and the State Harbor Commission for exclusive use of terminal facilities at the foot of Hyde street in San Francisco, where the company will have available 50,000 square feet in which to handle passengers on its electrically operated boats.

This site was chosen after failure to reach an agreement with the Pacific Gas and Electric Company. Three car lines—Hyde street, Stockton street Municipal and Larkin street—reach the close proximity of the terminal. The three blocks to Van Ness avenue are paved, three streets to the water front near the ferry are paved and Columbus avenue is being widened and paved through to Hyde street.

At the Alameda shipyards of James Robertson, work is being rushed on the first boat of the company. The engines are being built in Oakland and the motors in New York. Work will begin soon on the terminals and it is the intention of the directors to have the boat running in June.

Oregon Irrigation Congress to Enter Colonization Field

Plans are now under way to engage the Oregon Irrigation Congress more actively in development work of the state, according to announcement of Portland men in attendance at the eleventh annual irrigation congress held in Pendleton recently. Through a paid secretary with offices in Portland the organization will undertake colonization work on assured projects. This is a step deemed as vital as actually turning the water upon the land.

The irrigation congress cooperating with the Oregon state chamber of commerce, will begin to work out some plan to aid in attracting settlers either from the East or from the better developed sections of Oregon to the irrigated lands. An effort will be made to provide sums on easy terms that will enable settlers to make a start in the various districts. The congress endorsed the McNary-Smith bill now pending before congress, and the funds which it will provide will assure progress in putting through Oregon irrigation work.

Electrical men of Chehalis and Centralia on January 25 were hosts to lumbermen, architects, building contractors and realty dealers in those cities, at a banquet held in the St. Helens Hotel, Chehalis. The principal speaker of the evening was Stephen I. Miller, Jr., Seattle, secretary-manager of the Northwest Electrical Service League.

The properties of the Universal Electric and Gas Company of San Francisco, recently purchased by the Great Western Power Company, will be operated jointly by the latter utility and the Pacific Gas and Electric Company, subject to the approval of the State Railroad Commission, according to an announcement recently made by John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company. Each of the larger power companies will operate that portion of the Universal's holdings that is within their respective service territories.

Books and Bulletins

Switching Equipment for Power Control

By STEPHEN Q. HAYES, A.B., E.E.,

switchboard engineer, Westinghouse Electric and Manufacturing Company, 9 1/4 by 6 1/2 inches, 463 pages, 274 charts, diagrams and illustrations. McGraw-Hill Book Company, Inc., New York.

Switching equipment for power control has aptly been called the "brains" of the plant whose duty it is to produce or distribute electrical energy, in that it performs all of the duties of direction and control that are so vital to the proper functioning of the entire system.

This book constitutes the first American volume strictly devoted to this subject. The book contains information regarding standard practice as it exists today rather than special application of the subject. It ably fulfils its primary purpose, namely, that it furnish the actual switchboard operator with information that will aid him to keep the equipment in his care in the best operating condition, by explaining what should be expected of the apparatus.

The book should prove helpful to the student in electrical engineering in giving him a better understanding of the art. Consulting engineers and others will find enough information in the discussion of the theoretical features to give them an understanding of the functions and limitations of the various devices.

"Export Helps" is the title of a booklet just issued by the industrial machinery division of the bureau of foreign and domestic commerce, which describes the new service to machinery manufacturers and exporters which has recently been instituted by the Department of Commerce. The aims of the new division, the services which it offers and other interesting facts are set down in the booklet.

The Bates Steel Pole Treatise for 1921 has just been issued by the Bates Expanded Steel Truss Company of Chicago. The book is one of the most comprehensive yet to be issued on this subject, and is remarkably well illustrated. In addition to containing a full description of the Bates products, it devotes almost one hundred pages to facts pertaining to pole line engineering and economics with many valuable tables and charts.

To sell the idea of more time for the enjoyable things of life is the primary object of a most attractive and unusual little booklet which The Society for Electrical Development is ready to distribute. "More Leisure Hours" is the title, and in 24 entertainingly written and illustrated pages the booklet tells how hours of drudgery may be eliminated by the use of electric service and appliances.

Each page points out the service of one appliance as an aid to better and more economical living. While no too-obvious attempt is made to sell, few readers of the booklet can escape the desire to buy and use more electrical aids.

Meetings of Interest to Western Men

Vancouver Electrical Men Hear Lawrence W. Davis Speak

Electrical men of Vancouver, B. C., on March 2 were addressed at a dinner in the Hotel Vancouver by Lawrence W. Davis, of the National Association of Electrical Contractors and Dealers, and by M. K. Pike, general sales manager of the Northern Electric Company of Montreal. A hundred were present in spite of the epidemic of influenza. The gathering was held under the auspices of the Electrical Service League of British Columbia and the Vancouver Association of Electrical Contractors and Dealers, W. G. Murrin, assistant general manager of the B. C. Electric Railway Company being in the chair.

Mr. Davis, besides dealing at length with contractors' and dealers' problems, praised the work of the league, saying that the local men had in the league what was aimed at in the East.

Mr. Pike told of the progress of the electrical home idea in eastern Canada, such as in Toronto, Montreal and Hamilton. At the luncheon of the Vancouver Electric Club on March 3, Mr. Pike was a speaker on the same subject. He was accompanied on his western trip by Mr. Carswell, chief accountant of the Northern Electric Company.

Montana Contractor-Dealers Hold Annual Convention at Butte

Butte has been chosen for the next meeting place of the Montana Association of Electrical Contractors and Dealers, who in annual convention in that city on March 6 and 7, held one of the most widely attended and successful sessions in the history of the organization. Sixty members of the electrical industry as well as many visitors from outside the state attended the meetings.

The first day of the convention was given over to a summary of progress for the past year delivered by James H. Mills of Great Falls, the retiring president, and to routine business. The evening was devoted to a smoker held in the rooms of the Empeco Club.

The important feature of the convention was the program given on March 6, an outline of which follows:

"General Labor Conditions and the Outlook for 1922" by George I. Martin, secretary of the Montana State Associated Industries.

"Inspection and Materials" by J. Meriam, representative of the Underwriters Association.

"Your Problems of Wiring and Merchandising" by H. D. Sanborn, General Electric Company, Chicago.

Address by Lawrence W. Davis, special representative, National Association of Electrical Contractors and Dealers.

"The Business Outlook for 1922" by Stephen I. Miller, Jr., secretary-manager of the Northwest Electrical Service League.

The following officers were elected by the convention for the ensuing year:

President—Ernest Shelley of the Electrical Supply Company of Livingston.

Vice-president—Joseph Olson of the Electric Shop, Great Falls.

Secretary and treasurer—Emanuel Downing of the Independent Electric Company, Butte.

Directors—James H. Mills, Great Falls Electric Supply Company; Leroy N. Baker, Electric Shop, Missoula; O. C. Langstadt, Arnold Electric Company, Butte; Joseph Elves, Miles City Electric Company.

Northwest Jobber Salesmen Hold Meetings in Seattle

Under the auspices of the Northwest Electrical Service League a meeting of Seattle electrical jobber's salesmen was held in the L. C. Smith Building Restaurant, Saturday, March 4th. Thirty salesmen were present.

Professor W. D. Moriarty of the College of Business Administration of the University of Washington brought out, in a new and effective way, the principles and functions of window trimming. Pictures of four window displays which had been decorated for the purpose were distributed to the salesmen, who in turn will use them in their work with the contractor-dealers. Professor Moriarty discussed the function of window trimming as illustrated by the pictures. The principles of unity, simplicity, balance, grouping, harmony and action were illustrated and emphasized. Professor Moriarty emphasized the fact that a window is used to announce the store; that it should have, if possible, some heart interest; that what goes into the window depends upon the class and attitude of people that pass, whether they are in a hurry or have time for window shopping. He said that most windows had too many things in them and that the average person could only think of three things at a time.

California Electrical Safety Orders Near Completion

The revision of the Electrical Utilization Safety Orders of the California Industrial Accident Commission is nearing completion. The work has been in the hands of a well qualified committee for over two years. The result of their work is a tentative draft which is a combination of the present Electrical Utilization Safety Orders and the National Electrical Code, with modifications and interpretations of both, combined with the addition of several new sections which have not previously been covered by either.

The preliminary draft when printed is to be distributed to persons interested in reviewing the work. Suggestions that may be offered for changes in these orders, which would be consistent with safe practice and in conformity with existing standards for electrical construction, will be appreciated by the committee. Such suggestions should be mailed to the Industrial Accident Commission and, if possible, each should be submitted in the form of a substitute for the order in question, so that it may be considered by the committee as such.

The publication of this preliminary draft will make no change in the plan of later printing the orders in tentative form for further distribution and review before the advertised public hearings are held, after which the revision will be printed in final form. Not more than thirty days will be allowed for reviewing the work and returning the criticisms to the committee. The Industrial Accident Commission has ordered no additional copies of the 1916 Electrical Utilization Safety Orders and there is an urgent demand for the revised edition. Only a limited number of copies will be printed and applications will be filled in the order that they are received. Requests for the preliminary orders should be addressed to the Department of Safety, Industrial Accident Commission, 525 Market St., San Francisco.

Electric heating is popular in the Far North, according to word received from W. T. Stuart, manager of the Prince William Sound Water-Power, Light and Telephone Company, Valdez, Alaska. According to Mr. Stuart, the Seattle Hotel, which was recently completely electrified by his company, has the distinction of being the largest building in the Far North to be entirely heated by electricity. The company charges a flat rate of \$7 per month for a 2.5-kw. heater, giving twenty-four hour service. The Valdez Hospital has also been completely electrified.

The second conference on the business training of the engineer and the engineering training of the student of business has been set for May 1 and 2 at the Carnegie Institute of Technology, Pittsburgh, by the United States Commissioner of Education.

Plans for an intensive campaign for education in industrial and domestic electric heating have been instituted in Japan by the Osaka Electric Light Company. The first step in the program has been the cutting of the power rates to 3 cents per kw-hr.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ELECTROCHEMICAL SOCIETY

Spring Meeting—Baltimore—April 27-29, 1922

Frank Waterhouse, recently elected president of the Seattle Chamber of Commerce, is known as one of the leading and most public spirited business leaders in Washington's metropolis. He came to Seattle in 1898 and established himself in the shipping business, but his interests have been broad and he has organized and operated other business and commercial enterprises. Public service has animated Mr. Waterhouse's career. His war work has been



FRANK WATERHOUSE

characterized as extraordinary and in recognition of his activities in this field he was chosen president of the Seattle Chapter of the Red Cross, a position he still holds. He was one of the organizers and former president of the Associated Industries of Seattle, the organization which established the American plan in that city in 1919 following a series of labor difficulties. As a shipping man, he was a pioneer in the establishment of certain Alaska routes, in opening up the Seattle-Siberia trade and in certain Oriental enterprises.

H. A. Rutherford, Seattle, has been appointed superintendent of State Parks of Washington, with offices in the state highway department in Olympia. The work of the superintendent of parks will be largely educational.

George W. Bixler of the Denver Gas and Electric Light Company, representing the Rocky Mountain Committee on Public Utility Information and the Denver Electrical Cooperative League, addressed the Lions' Club meeting at Boulder, Colorado, March 8th, as one of the Electrical Week features in that city.

H. L. McGovern has been made a partner in the Cahn-Forster Electrical Company of Denver.

J. C. Davidson, manager of the electrical department of Hendrie and Bolt-hoff, one of the large Denver jobbers, is touring the East in the search of "new ideas."

Frederick H. Reid, general manager of the Mountain States Telephone and Telegraph Company with headquarters in Denver, has been elected vice-president of the Southern Bell Telephone Company and will shortly leave for Atlanta, Ga.

George R. Randall, manager of the Salt Lake Electric Supply Company of Salt Lake City, is a recent San Francisco visitor, having come to the coast for the purpose of studying business conditions in this section.

Personals

Josiah E. Spurr, editor of the Engineering and Mining Journal-Press, the consolidated mining paper representing the best elements of the Engineering and Mining Journal of New York and the Mining and Scientific Press of San Francisco, has been a recent San Francisco visitor in the perfecting of the new consolidation. After a ten days' visit in the West, he has returned again to New York City. T. A. Rickard, formerly editor of the Mining and Scientific Press, will be contributing editor for the Journal-Press with headquarters in San Francisco.

Dr. T. A. Addison, Pacific Coast manager of the General Electric Company, has recently returned to his office in San Francisco after an extensive tour of the world. Dr. Addison left New York City last October, visiting Italy, Egypt, India, China and Japan. Dr. Addison is one of the pioneers in the electrical industry on the Pacific Coast, having come to San Francisco in 1890 to take charge of the western branch of the Thompson-Houston Company which later amalgamated with the General Electric Company. He has been Pacific Coast manager of the latter company for more than thirty years.

F. K. Zook, valuation engineer for the Northwestern Pacific Railroad Company, has retired from his position after fifty-one years of successful railroad service.

R. A. Balzari, manager of the industrial division of the San Francisco office of the Westinghouse Electric and Manufacturing Company, has been elected president of the San Francisco Electrical Development League for the coming year. Mr. Balzari is a graduate of the University of California. He began his career in the electrical industry with the Pacific Gas and Electric Company and entered the San Francisco office of



R. A. BALZARI

the Westinghouse company in 1908. Mr. Balzari has been very active in the affairs of the Pacific Coast Geographic Division of the N. E. L. A., now the Pacific Coast Electrical Association, having served as chairman of the membership committee. Previous to his election to the presidency of the Electrical Development League, he was one of the most active members of this organization.

Walter C. Wurfel, president and sales manager of the Electric Supplies Distributing Company of San Diego, has been elected president of the San Diego Electric Club for the coming year. Mr. Wurfel began his career in the electrical industry at the age of 19 with the Jenney Electric and Manufacturing Company, Indianapolis. Later he came to Denver and was associated with the Mountain Electric Company. Subsequently he served as power apparatus



W. C. WURFEL

salesman with the Western Electric Company at the Denver branch, later going to Salt Lake City, where he served this company and later the Inter-mountain Electric Company. He joined the Westinghouse Electric and Manufacturing Company in Denver. In 1915 he was appointed Pacific Coast manager of the Westinghouse Lamp Company. He purchased the controlling interest in the San Diego jobbing firm which he now heads in 1920. In addition to being one of the most active members of the Electric Club, he is prominent in the affairs of the Rotary Club as well as other civic and commercial organizations.

Raymond Alvord, manager of the local supply department of the General Electric Company in San Francisco, is receiving many congratulations on the excellent salesmanship study course that is being conducted for retail electrical merchants in that city under the auspices of the California Electrical Cooperative Campaign. Those who have had a substantial part in the forwarding of this work among contractor-dealers are H. H. Miller, Pasadena, California; H. H. Courtright, Fresno, California; Louis Levy, San Francisco, California, and James Wood, Sacramento, California.

James Hamilton Mills, president of the Montana Association of Electrical Contractors and Dealers with headquarters at Great Falls, Montana, has spent the major portion of the last bi-weekly period in Butte, Montana, where he has conducted a very successful annual meeting of the State Association.

C. E. Grunsky and W. L. Huber, two prominent consulting engineers of San Francisco, are largely responsible for the bringing of the national convention of the American Society of Civil Engineers to the Pacific Coast in October, when a meeting devoted to water power development will be held in San Francisco.

William C. Sterne, who was elected chairman of the Rocky Mountain Committee on Public Utility Information to succeed T. O. Kennedy, has had a varied industrial career along with his engagement in the public utility business. After graduating from Harvard University in 1891, he went to Europe in the interest of a fertilizer company and in 1895 he moved to Colorado where he engaged in the drug and chemical manufacturing business. He then trans-



W. C. STERNE

ferred his attention to the banking and lumber business. In 1905 he started a central station which is now known as the Summit County (Colo.) Power Company, and with the Municipal Properties Investing Company he assumed control of the Arvada (Colo.) Electric Company, the Arapahoe County (Colo.) Electric Light and Power Company, the McCook (Nebr.) Electric Company, and the Fort Lupton (Colo.) Light and Power Co. In addition to these interests, he is president of the Littleton (Colo.) Lumber Company and is a director of the Hamilton National Bank of Denver. "Bill," as he is generally known, is considered one of the Doherty organization's most progressive executives.

C. W. Stone, manager of the lighting department of the General Electric Company, together with F. H. Babcock and G. F. Brown, members of the same department, are recent visitors at the Pacific Coast headquarters of the General Electric Company at San Francisco. The trio of lighting experts are touring the West.

William McClellan, president of the American Institute of Electrical Engineers, has opened offices for the general practice of engineering and construction in New York City, in conjunction with Peter Junkersfeld and Horace T. Campion.

Edwin M. Herr, president of the Westinghouse Electric and Manufacturing Company, recently spent several days in Denver, his boyhood home. Mr. Herr began his career in the electrical industry in that city in 1878 as a telegraph operator. He later went to Yale, and joined the Westinghouse company upon graduation.

Joseph Jacobs, consulting engineer of Seattle, has been named consulting expert for the greater Wenatchee and Quincy irrigation projects in Washington.

Samuel H. Taylor, secretary of the Pacific Coast Electrical Association affiliated with the N. E. L. A., has retired from the presidency of the Electric Railway and Manufacturers' Supply Company of San Francisco and will devote all of his interest to the Safety Electric Company, which he owns. On March 21 Mr. Taylor celebrated the thirty-eighth anniversary of his entrance into the electrical industry in California. In 1898 he organized the company from which he has just resigned and of which he became president in 1906. He will be succeeded in the presidency by W. H. Whiteside, Pacific Coast adviser to the Westinghouse Electric and Manufacturing Company.

Lee H. Newbert, manager of the East Bay division of the Pacific Gas and Electric Company, has been elected to membership on the board of directors of the Oakland Chamber of Commerce.

Clyde C. Kennedy, consulting engineer of San Francisco, has announced a change of office location from the Holbrook Building to 626-628 New Call Building.

A. W. Copley, general engineer for the Westinghouse Electric and Manufacturing Company, delivered an interesting lecture before the San Francisco section of the A. I. E. E. on March 24 on the subject of "Engineering Short Cuts as Applied to Power Circuit Studies." A man of broad experience in the study and practice of power systems, Mr. Copley presented a highly instructive address.

Charles H. Talmage, for the past six months field secretary of the Rocky Mountain Electrical Cooperative League of Salt Lake City, has resigned from that position to become manager of the Omaha branch of the Western Electric Company. Mr. Talmage has been associated with the electrical industry for more than twenty years, having joined the Western Electric Company in 1901. Before taking over the Salt Lake City office of the company in 1917, he was



C. H. TALMAGE

branch manager at Kansas City. During the five years he has spent in the Intermountain district he has been one of the most active members of the electrical industry. He was instrumental in the formation of the Rocky Mountain Electrical Cooperative League and served on its advisory committee from the time of the league's organization until his appointment as secretary. He will be keenly missed by his associates in that section of the West.

John D. Scott, commercial engineer of the Portland Railway, Light and Power Company, is the new chairman of the Portland section of the National Electric Light Association, and is doing much to make the meetings successful and of general interest to the men engaged in the electrical industry in this district. Mr. Scott is a graduate of Lehigh University. After holding the position of efficiency engineer of the People's Gas, Light and Coke Company



J. D. SCOTT

of Chicago, he came West and entered the employ of the U. S. Smelting Company of Salt Lake City, as assistant chief electrician. He later was in the employ of the Utah Light and Railway Company and the Bell Telephone Company, both of Salt Lake City. In 1911 he entered the employ of the Portland Railway, Light and Power Company, and after doing engineering and construction work in connection with the River Mill hydroelectric development of that company, transferred to the commercial department where he has held successively the positions of industrial power engineer, commercial office manager and commercial engineer.

Hilmar Pabst, general manager, and E. L. Hall, general superintendent, of the Portland Gas and Coke Company, are recent San Francisco visitors.

Obituary

John H. Felthousen, chief engineer of the S. Morgan Smith Company of York, Pa., died recently at his home in New York. Mr. Felthousen has been associated with the Morgan company for many years and has been closely identified with the activities which have marked the advancement of modern power equipment. His loss will be felt by a host of friends and associates in the hydraulic industry, in which he has been one of the leading figures.

George E. Henderson, electrical engineer connected with the San Francisco district office of the National Carbon Company, and electric furnace specialist, died recently. Mr. Henderson was a veteran of the Royal British Engineers. His loss will be felt by the electrical industry of the entire West.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Low temperatures caused snows in the high altitudes to pack firmly, and an abundant water supply for irrigation purposes and hydroelectric plants is now definitely assured through the summer months. The pack at Summit in the Sierra Nevada Mountains is reported to be 156 inches, as compared with a pack of 100 inches at this time a year ago. The month as a whole was not favorable for farming activities, and very little seeding has been accomplished; however, the continued rainfall has been extremely beneficial to crops already planted, and with the beginning of spring weather, growth should be rapid. Continued favorable reports from trade centers in this district tend to confirm predictions of steadily improving business conditions. There is still some tendency to keep prices up because of higher original costs on merchandise that has not moved, but there has been a general mark-down to at least absorb most of the profits of last year, and large handlers, realizing the futility of evading the facts, have taken their losses and figures down to present cost basis. Better demand for nearly all classes of merchandise is stabilizing prices on a new basis. Building operations continue brisk, particularly in cities and manufacturing towns. Declines in hardware, plumbing goods, electrical equipment and other building materials have helped to make a market and to stimulate buying of materials for remodeling stores and homes along with the large amount of new construction.

Some eastern producers are establishing representation here, and the general disposition is to go after business.

Stocks of dried and canned fruits are considerably lower than one year ago, and crop conditions are favorable, although the cool weather has retarded the season. Late spring rains have done much to encourage the grower of grain and forage crops, and livestock men in the interior are looking for a good year after a rather hard winter.

Banks report discount rates lower money plentiful, but considerable care is used in granting new unsecured credits. On the exchanges and with bond houses investment buying continues.

SEATTLE

In Seattle at the present time, according to a conservative estimate, there is more than \$3,000,000 worth of building construction under way. These buildings include 300 new homes, 36 store and office buildings, 24 warehouses, three churches and four apartment houses. In addition to this construction for which permits have al-

ready been issued, buildings estimated to involve the expenditure of several more millions of dollars are projected.

The city of Seattle has at present more than \$1,000,000 worth of improvement work under way in the city proper, in addition to the \$2,000,000 Skagit River tunnel project, and other work on this big hydroelectric project, and the city engineering department reports at least \$2,000,000 more will be spent on city improvement work during the season. In addition to the above expenditure, the Seattle Board of Public Works will shortly call for bids for the installation of a 17-mile \$2,000,000 pipe line for the Water Department, this line extending from Molasses Creek to the Volunteer Park reservoir in the city.

King county has already contracted for \$300,000 worth of highway construction and will award road contracts, aggregating another \$500,000 worth of road construction before summer.

The unemployment situation in Seattle is daily improving and when all of the above projects are actually under way, it is expected all of the slack will be taken up in the local situation.

Retail and wholesale trade are holding their own, in spite of extremely inclement weather in the month of March. A slight improvement is noted in many lines, and there is a decided feeling that next month will show further betterment in all lines of business.

SPOKANE

Lumber mills throughout the Inland Empire are preparing to resume operations with large crews. With the exception of the Potlatch Lumber Company's mills at Potlatch and Elk River, Idaho, all of the big mills in northern Idaho and eastern Washington will reopen within the next 30 days.

The resumption of logging operations is contingent upon weather conditions. Many of the mills have logs imbedded in the ice of the rivers and lakes, while others must establish camps in the woods before tuning up their saws.

Work will be provided for hundreds of men as the mills reopen and labor will be provided for others in the woods when weather conditions will permit spring logging.

Considerable activity in mining districts is reported. Development work long held in abeyance because of unprofitable prices, is now going ahead.

Jobbing business continues to compare favorably with that of a year ago and buyers are more disposed to anticipate their future wants. There is a noticeable improvement in rural orders, due to better agricultural prospects. Retail business is of about the same volume as in the opening weeks of the year.

LOS ANGELES

January crude oil production averaged 313,472 barrels daily, making a decrease in total production for the month of 15,159 barrels, or 410 barrels daily. Stocks were increased by 1,239,164 barrels, bringing the total storage up to 32,795,441 barrels on February 1.

Most of the estimates of the loss to citrus fruits from frost range from 55 to 70 per cent. The recent heavy rains have insured abundant feed, and in the cattle districts have saved the situation. Winter sown grains are making satisfactory progress, the acreage being somewhat larger than had been anticipated as to wheat and barley, and about the same as to oats.

Los Angeles building for January and February shows an increase of 143 per cent over the same months of 1921, the comparative figures being \$15,572,828, and \$6,433,384. Bank clearings for the two months show an increase of over \$78,000,000. Lumber receipts of Southern California in 1921 were 780,501,487 feet.

Retail trade, as reflected in reports to the Federal Reserve Board from 33 department stores in the Twelfth District, continue to show an increase in the volume of trade. Ten wholesale lines report an increase in volume of sales in January as compared with those of January, 1921.

SALT LAKE CITY

It appears that the rather severe winter which has been experienced in the intermountain section is at an end, and with the advent of spring better business conditions are expected.

Several good-sized irrigation projects will probably be launched in the near future, and this, in addition to the extensive road building work in various localities, which is expected to materialize this coming spring and summer, will undoubtedly relieve the unemployment situation to a considerable extent.

About 30 men were recently added to the payroll at Bingham, and modified operations are expected. Mining operations along other lines, however, are quite extensive, and many of the old reliable mining camps are keeping their production almost up to normal.

Some encouragement is seen for the farmers and livestock raisers in the increase in prices of their products. Electrical contractor-dealers, while they have experienced some rather quiet times, are looking forward to renewed activity in the very near future as a result of extensive building operations which will undoubtedly begin with the spring weather. Retailers in general

report business as rather quiet, due to the unfavorable weather conditions, which have existed until recently. Collections are reported as fair.

There is a general feeling in this section that a business revival is not far off, and there are many indications that the coming spring and summer will show considerable improvement.

PORTLAND

If the building situation is an accepted barometer of economic conditions, Portland is rapidly recovering from the slack condition of the past year. Construction on new office buildings and a hotel is about to begin, the cost of which will run well over a million dollars. The lumber situation remains about the same, production running from 10 to 15 per cent below normal from week to week. Lumbermen are confronted with a log shortage due to the closing down of logging camps on account of bad weather conditions. The demand for wheat continues active and three full cargoes have been sold for early shipment. Electrical jobbers report conditions as continuing quiet although there is apparently no feeling of apprehension about the future. Country business is very spotty. Demands for radio equipment continue unprecedented. Contractor-dealer business is also somewhat spotty, some reporting conditions very good. Residence wiring is very active and many larger jobs are being taken, but competition is so keen that the profits are small. Electric ranges are selling more rapidly than any other line of appliances.

DENVER

Spring weather increased building activities, better collections, and plans for extensive development indicate that business has taken a marked turn for the better. The unemployment problem is still a serious one, however.

Actual buying is again being done in uncertain quantities. Some jobbers report small movements while others show increased demands for seasonable merchandise. Several of the largest electrical jobbers are making plans for considerable new business to be developed this spring and are adding to their organizations.

Business "dopesters" forecast a complete revival by May but it is generally believed that conditions will not become stabilized until after the fall harvest. Developments during the past fortnight are sufficiently encouraging, though, to give a tone of optimism to nearly all Rocky Mountain industries.

The new bank statement shows deposits in Denver banks of more than \$145,000,000, a slight increase over the December statement, and an increase also over the February 21 statement last year. The ratio of cash and exchange to deposits is 37.8 per cent, a new high point. Rediscounts are approximately \$1,000,000, showing a reduction of 30 per cent and marking a low level for this item. Cash and exchange have increased \$12,000,000 since December 31—about 28 per cent.

Conditions in Twelfth Federal Reserve District

Current Summary Shows Easier Credit Conditions in Agricultural Districts Indicating Increased Purchasing Power For Farmers From Price Revisions

The monthly report on business and agricultural conditions issued by John Perrin, chairman of the board and Federal Reserve Agent of the Federal Reserve Bank of San Francisco, indicates several tendencies of the past month which will have a salutary effect on business in general. The Twelfth Federal Reserve District includes the states of California, Washington, Oregon, Idaho, Utah, Nevada and Arizona. A summary of the report follows:

Easier credit conditions in agricultural sections have been the immediate results of advancing prices for the principal agricultural products of the district, including cattle, sheep, hogs, the grains, the fruits, wool and sugar. During the four weeks ending March 8th, normally a period of some credit expansion in this district, country members reduced their borrowings from this bank by approximately \$3,000,000 or 8.2 per cent. In the same period the prevailing interest rate charged borrowers in Salt Lake City, the financial center of the intermountain district, declined from 8 to 7 per cent and in Spokane, the center of another great agricultural section, from 7 to 6½ per cent. Advances during the past two months in the prices of farmers' products, accompanied as they have been by stability or a moderate decline in the price of most other groups of commodities, have effected a more nearly normal relation between the prices of things the farmer sells and the price of the things he must buy than has prevailed for the past year and a half. Such an adjustment has long been considered essential to any marked improvement of the general business situation.

Carryover Stocks

In contrast with conditions prevailing a year ago, carryover stocks of agricultural products are at present normal or below normal. The March 1st report of the United States Department of Agriculture showed that stocks of wheat on the farms of the principal wheat growing states of the district amounted to but 10 per cent of the former season's crop. Last year on the same date approximately 16 per cent of the 1920 crop was still held by the producers. Stocks of barley in California have been similarly reduced from the exceptionally high levels of 1921 and holdings of wool and of canned and dried fruit are less than the amounts customarily on hand at this season.

Lumber and Mining

Productive activity in this district was well sustained during the short month of February. In the lumber industry, production, shipments, and orders received were greater than in January, 1922, or February, 1921. The mills operated at approximately 85 per cent of normal capacity compared with 50 per cent a year ago. The resumption of inquiries for lumber from the agricultural states of the middle west was a particularly hopeful sign, especially for the inland mills which have not shared in the thriving water trade

with the Atlantic Coast and Japan. Continued slow improvement was noticeable in the mining industry, effected more by lowered costs of production than by appreciation in mineral prices. Work is proceeding slowly at the five large copper mines of the district which in January announced that operations would be resumed. No ore has yet been mined by them. Figures now available on the January sales of electric power provide further evidence of increased industrial activity. Total industrial sales were 8 per cent greater in the Pacific Northwest and slightly greater in California than in January, 1921, the latter increase occurring despite a marked reduction in consumption for agricultural purposes. Similar improvement in the intermountain states is not yet discernible.

Increased productive activity and the resumption of seasonal outdoor work in some sections have combined to relieve the unemployment situation and more men were employed in February than in January. The peak of unemployment appears to have been passed.

Retail Trade

Notwithstanding accumulating evidence of better business in the future, buyers both at retail and at wholesale are proceeding cautiously. Retail sales as reported by 33 department stores and mail order houses compared less favorably in February with those of the previous year than did January sales. The dollar value of sales in February was 8.7 per cent less than a year ago compared with a decline of but 6.3 per cent from January, 1921, to January, 1922. Sales at wholesale, reported by 185 firms in 10 lines of business, did not continue the improvement noted in each month since October, 1921. Comparison of sales in January and February of this year with sales in the corresponding months last year shows that in seven of the ten lines, there was an increase, during February, in the percentage of decline in value of sales as compared with January. In five of the ten lines the decline in the value of sales was greater than the average decline of wholesale prices during the past year, indicating a decrease in the physical volume as well as in the value of sales.

Building Activity

Building continues more active than a year ago. The number of permits issued in 20 principal cities in February, 1922, exceeded the number issued in February, 1921, by 14.0 per cent and the value of the 1922 permits exceeded the value of the 1921 permits by 60.5 per cent. Substantial improvement in the physical volume of business being transacted throughout the district is indicated by figures on debits to individual accounts in 20 clearing house centers. In the four weeks ending March 1, 1922, debits to individual accounts were only 3 per cent less than in the same period in 1921. In January, 1922, the decline compared with the previous year was 8.2 per cent.

The B-G Electric Shop and the Utah Electric and Motor Equipment Company, both of Salt Lake City, have consolidated under the firm name of the B-G Electric Shop, Inc., and will be located at 37 East First South Street. The new company will be under the management of Blaine Grey, former manager of the B-G Shop. The present store will be entirely remodeled and a complete line of electrical equipment and appliances installed.

W. Wesley Hicks has announced that the Wesix Electric Heater factory has moved to new and larger quarters at 115 Minna street, San Francisco. The offices of the company have been moved to the same location.

M. Zimmerman of the A and R Lamp Company of Newark, N. J., manufacturers of gas and electric portables, recently visited San Francisco. Mr. Zimmerman also represents the Radiant Lighting Fixture Company of New York.

The Electric Specialty Company of San Francisco will move into new and larger quarters at 75 Fremont street shortly after April 1.

Schweitzer and Conrad, Inc., Chicago, has perfected a new high voltage detector which is described in bulletin No. 105-A. Safety, simplicity and compactness are some of the features claimed for the device.

The Harvey Electric Company of Chicago has been formed through the merger of the Empire Transformer Company, with the Marquette Electric Company and the American Forge and Manufacturing Company.

H. H. Luedinghaus, sales manager of the St. Louis Malleable Casting Company is touring the Pacific Coast for the purpose of selecting distributing agents for the company's line of pole line hardware. Charles R. Kierulff, 757 Los Angeles St., Los Angeles, has been chosen representative for the company's products in Southern California.

Alex E. Krug, sales manager of the St. Louis Screw Company, is touring the Pacific Coast in the interests of his firm.

C. T. Riggs has opened a new electrical appliance shop at Independence, Oregon.

Walter Marshall and Robert Anderson have opened a contractor-dealer shop at Tacoma, Washington.

The Western Electric Company has been absolved of all charges of unfair competition by the Federal Trade Commission. The commission ordered the dismissal of the charges brought in January, 1921, after its attorneys had made a thorough investigation of the case and failed to find any facts to substantiate the original charges.

The Edison Electric Appliance Company, Chicago, manufacturers of Hotpoint appliances, announces the perfection of a new Hotpoint waffle iron. The new appliance is 8½ inches in diameter and is finished in polished aluminum and nickel plate. It embodies several new ideas in design and is made to sell at a popular price.

The Russell Electric Company, Chicago, manufacturers of "Hold Heet" electrical appliances, has placed on the market a new grill and a new sectional hot plate. The grill weighs one pound and is small and compact. The hot plate has three independent heating units giving seven heat combinations.

Manufacturer, Dealer, and Jobber Activities

The Cutler-Hammer Manufacturing Company, Milwaukee, has issued publication No. 2056 describing the new C-H appliance cord. The booklet is prepared for the use of dealers and space is provided for imprints.

The Union Electric Manufacturing Company, Milwaukee, has perfected a new type 30-ampere, 3-pole, 220-volt safety motor starting switch. The switch is provided with or without no-voltage release.

The Binks Spray Equipment Company, Chicago, has prepared bulletin No. 4-C describing the Binks spray tower, a water cooling device designed for small ice machines, oil engines and water cooled transformers, requiring the cooling of small quantities of circulating water. The towers are furnished in capacities ranging from 10 to 60 gallons per minute.

P. W. McCauley, western representative of the Russell Electric Company, with headquarters in Chicago, is a recent San Francisco and Los Angeles visitor.

The F. W. Wakefield Brass Company of Vermilion, Ohio, has added a general purpose hanger to their line of "Red Spot" hangers for commercial lighting units. They state that their aim in offering this general purpose hanger is to provide the trade with the cheapest good suspension that can be made.

William P. Swartz, formerly of the A. T. Knowlson Company of Detroit, has opened an electrical jobbing business at 754-760 North Spring Street, Los Angeles, under the firm name of the Commercial Associates. The new company will represent the Standard Electric Company, Sunnysuds and Aerobell electric washers, and Ohio-Tuec and Regina vacuum cleaners. An exhibit will be maintained in the Furniture Exchange Building, San Francisco.

The Arrow Electric Company, Hartford, Conn., is sending to jobbers who handle its lines copies of all advertisements run by the company to be used in place of ordinary "stuffers." The imprints carry the name of the jobber in a prominent place.

The Crooks-Nathan Household Appliance Company, of Denver, has been secured by Norman Ives to represent the Hamilton-Beach Company in that city in the sale of its new type vacuum cleaner.

The Mountain States Machinery Company of Denver has taken on the G and W Specialty Company line of potheads and disconnecting switches.

The Lovejoy Automatic Door Opener Company of Laramie, Wyo., has moved into its new factory, increased space having been necessitated through the increase in business of that company.

I. K. Browning has opened an electrical store at Burlington, Colorado, and intends to specialize in radio apparatus.

A contest for central station employees and electrical dealers has been launched by the Mine and Smelter Supply Company of Denver for the best statement of features and advantages found in the Westinghouse Type "M" iron.

One of Denver's largest jobbers, the Hendrie and Bolthoff Company, has been appointed Rocky Mountain distributor of the Radio Corporation of America.

The Mine and Smelter Supply Company, Denver jobbers, has introduced the new Sunshine vacuum cleaner in the Intermountain territory. The cleaner is manufactured by the Wise-McClung Company for Westinghouse distributors, it is understood.

The Whitaker Ranch Light Company of Denver, one of the oldest dealers of portable outfits in that city, is now specializing in the sale of Western Electric farm plants.

The Electric Supply and Construction Company, electragists and fixture makers of Denver, has perfected an electric cigar lighter which will shortly be placed on the market.



THIS IS NOT THE THIRD ARBUCKLE JURY

Even though this convivial crowd hails from Los Angeles, they have no connection with Hollywood or the motion picture colony. The main thing they put in motion is the Los Angeles Electric Club for they are the moving spirits of this organization. Most of them are officers of the club. The back row depicts, from left to right, W. A. Knost, the executive-secretary of the Electric Club; H. W. Allen, sales manager, Graham-Reynolds Co.; J. G. Pomeroy, manufacturers' agent. The front row presents some equally auspicious figures. They are D. W. Pontius, general manager, Pacific Electric Railway Company; E. R. Northmore, electrical engineer, Los Angeles Gas and Electric Company; Harry L. Harper, retiring president of the club, district manager, Western Electric Company; K. E. Van Kuran, newly elected president of the club, district manager, Westinghouse Electric and Manufacturing Company; Frank Van Vranken, general manager, Los Angeles Railway Company; J. E. MacDonald, secretary, Joint Pole Committee; B. G. Wright, commercial manager, Southern California Telephone Company, and H. B. Woodill of the Woodill-Hulse Company.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

BAKER, ORE.—Plans for a \$50,000 plant at Chico and H Streets are being made by the Union Oil Company of California.

WENATCHEE, WASH.—Chelan county will spend a total of \$330,000 on roads this season, according to announcement by County Commissioner Cadman.

WALLA WALLA, WASH.—Bids will be called for the construction of the bridge across the Snake River at Central Ferry near Dayton in September. The estimated cost is \$300,000.

KLAMATH FALLS, ORE.—Parker & Banfield, of Portland, have been awarded a contract for the construction of a two-story brick theater and office building for Hart Bros. of this city.

MONROE, WASH.—At a recent election by a vote of 8 to 1, \$84,000 bonds were authorized for making Lake Cochran available as a water supply for the town. Erection of a filtration plant is also contemplated.

EVERETT, WASH.—Bruce & Company of Seattle have been awarded the contract by the Great Northern Railway for construction of a 200-ft. steel span across the Miller River. The contract price is said to be \$200,000.

SEATTLE, WASH.—The J. A. McEachern Co. of Seattle was awarded the contract at \$300,000 to construct a sea wall. A contract for pier extension work, at a cost of \$700,000, was awarded to Henry & McPhee, of Seattle.

SALEM, ORE.—Construction of the plant of the Capital Ice and Cold Storage Co., at an estimated cost of \$75,000, has started. F. L. Leonard of Portland has the contract for the construction of the building and installation of machinery.

SEATTLE, WASH.—Pratt & Watson, contractors of Olympia and Tacoma, have been awarded the contract for construction of the foundation and first floor walls of the new state capitol main building on their bid of \$397,514. Work will be started immediately.

SPOKANE, WASH.—A contract to sink 200 ft. to a new low level in the Morning Mine in the Coeur d'Alenes has been let by the Federal Mining & Smelting Company, owners of the property. This will give a depth of 2250 ft. in the main working tunnel, and will reach a depth of approximately 1700 ft. above sea level.

BELLINGHAM, WASH.—The Highland Dairy Co. will start the construction of a modern brick and tile structure at Mount Vernon to meet its present dairy needs and to provide for the installation of an ice cream manufacturing plant. A modern refrigerating system will be included.

SEATTLE, WASH.—Bids for the proposed Garfield High School building were ordered called for by the school board on two plans, the first plan submitted by the architect being for a completed building, estimated cost \$725,000, and the other for an uncompleted building to cost approximately \$600,000.

SEATTLE, WASH.—The Alaska Engineering Commission has completed plans for a single track structural steel bridge to be erected at Nenana on the line of the government railroad. The bridge will have a main span of 700 ft. and will require 2883 tons of steel. Bids will close at 11 a.m. on May 1 at the commission's office, 422 Bell Street Terminal, Seattle.

PORTLAND, ORE.—Permits for appropriation of water from Big Sheep creek and tributaries have been granted to the Mountain Sheep Irrigation District for irrigation purposes. A dam and canal 13 miles long, now under construction, are estimated to cost \$125,000.

SPOKANE, WASH.—The Great Northern Railroad is contemplating an improvement program for the Hillyard terminals here calling for the expenditure of approximately \$500,000 in the next three to five years. The plans include new shops about twice the size of the present buildings, an iron foundry and a new railway station.

SEATTLE, WASH.—Work has started on the Spring Apartment Hotel, a 11-story and basement structure of reinforced concrete. The cost, equipped, is estimated at \$750,000. John Graham is the architect; Hans Pederson is the general contractor and the operation of the building will be under the management of West & Wheeler. When completed, this hotel will be the third largest building in the city.

SEATTLE, WASH.—Plans for the big concrete and steel Skagit river power house are nearly completed in the offices of hydroelectric engineer C. F. Uhden, in the Alaska Bldg., and construction will begin about June 1. Plans call for a building 168 by 90 ft. in size and 112 ft. in height with three floors, walls solid metal sash. The machinery to be installed before the end of the year. Two huge generators with water wheels in addition to six transformers will be housed. Above the generators a crane way to accommodate a 150-ton electric traveling crane with a clear span of 45 ft. is to be erected.

SEATTLE, WASH.—The Board of Lewis County Commissioners will receive bids at Montesano until 2 p.m. April 7 for the contract to erect a 130-ft. steel bridge resting on concrete piers and spanning the north fork of the Newaukum river on the A. Mitchell road. In addition to the span proper, 180 ft. of pile trestle approach will be constructed. (Improvement No. 227.) Also (Improvement No. 228), for constructing an 80-ft. steel bridge, tubular piers and 165 ft. of pile trestle across the North Fork of the Newaukum river on the Newaukum river road. Bids will also be accepted on constructing both of the foregoing improvements under one contract.

THE PACIFIC CENTRAL DISTRICT

RICHMOND, CAL.—Additions are being to the plant of the Pacific Sanitary Mfg. Co. made to the plant of the Pacific Sanitary Mfg. Co. at 5th and Hensley Streets, at a cost of \$60,000.

SAN FRANCISCO, CAL.—Stephen F. Whitman & Sons, Inc., of Philadelphia, a large manufacturing concern, has decided to open a branch factory here, under the management of E. Farm.

ATASCADERO, CAL.—The Gay Engineering Corporation has been awarded contract for the erection of a cold storage and precooling plant, to be in operation by July 1st. The contract was made by the Caladero Products Co. and E. G. Lewis, personally, but it is intended to form a separate corporation to take over and manage this business.

NAPA, CAL.—The Napa Union High School district has purchased a 40-acre tract from the Southern Pacific Company to be used as a site for the Union High School. Work will begin immediately on plans and specifications by Architect Weeks, of San Francisco.

SACRAMENTO, CAL.—The California Life Insurance Company will erect an office building at the southwest corner of Tenth and J Streets, to cost approximately \$1,000,000. The building will be eight or ten stories high, of steel and concrete construction. Work will start by July first.

SACRAMENTO, CAL.—The Independent Laundry Company, recently incorporated for \$150,000, is planning the establishment of a new laundry here, the plant and equipment to cost approximately \$100,000. The directors of the company are J. F. Sterner, J. S. Blair, A. C. Kallstead, C. M. Jones and H. N. Mitchell.

SELMA, CAL.—Consolidated Irrigation District is planning to authorize a bond issue of \$850,000 of which \$775,000 will be expended for the purchase of the system of Consolidated Canal Company and \$75,000 for additions and betterments. W. L. Huber, First National Bank Building, San Francisco, is engineer for the district.

SAN FRANCISCO, CAL.—One of the last remaining large vacant holdings on Market Street has been sold by the McCreery Estate Company to Arthur F. Rousseau. The property has frontages on Market, Eighth and Mission Streets. Mr. Rousseau intends starting improvements immediately. The property will be divided into smaller units, with a view to the erection of ten buildings of from four to six stories each and representing an investment of possibly \$10,000,000. Plans have been completed for two of the projected buildings, which will be of brick and steel construction.

SAN FRANCISCO, CAL.—Until April 12, 3 p.m., bids will be received by the Board of Public Works for furnishing and delivering under Contract No. 79, Hetch Hetchy Water Supply Project: Water Wheels and Valves for Moccasin Creek Power Plant. Bids will be taken under Section A, Water Wheel Units: 2, 3 or 4 25,000-hp. double overhung impulse water wheel units, each to drive a 20,000-kva. electric generator. Under Section B: Valves 4, 6 or 8, 36-in. valves—2 for each water wheel unit. (A single contract may be awarded covering both the water wheel units and the 36-in. valves or a contract may be awarded for water wheel units and another for valves.)

SAN FRANCISCO, CAL.—Until April 12, 3 p.m., bids will be received by the Board of Public Works under Contract No. 180, Hetch Hetchy Water Supply Project, for furnishing and delivering electric generators and accessory equipment for the Moccasin Creek Power Plant: Two 20,000-kva. electric generators, each with a direct connected exciter, also with one independent motor generator exciter set. (Provision is made to increase number of electric units to 3 or 4 within a period of 6 months.) Each of the main electric generator units will be driven by two 12,500-hp. water wheels overhung on the generator shaft. The shaft, the extension for the exciter, and the bearings, will be furnished with water wheels, under a separate contract. Plans may be had from City Engineer M. M. O'Shaughnessy, 3rd floor, City Hall.

NAPA, CAL.—The Union Ice Co. has announced that an ice plant will be built here to cost approximately \$500,000. The building will be a four-story, reinforced concrete structure.

YUBA CITY, CAL.—Grape growers of Yuba and Sutter counties will have the raisin packing plant they requested, according to announcement made by W. M. Giffen and F. A. Seymour, of the California Associated Raisin Co. The plant will be located here.

COLFAX, CAL.—B. C. Soule, owner of a large tract of timber on the Forest Hill divide, and L. D. Stephenson, engineer in charge of operations, were in this city recently seeking a 25-acre site in this locality for a piling ground, planing mill and box factory.

THE PACIFIC SOUTHWEST

BURBANK, CAL.—The Pear Growers' Assn. of Palmdale has decided to erect a \$225,000 refrigerating plant in Palmdale.

LOS ANGELES, CAL.—The North American Polish Co., with head offices in Cleveland, Ohio, will erect a factory near Los Angeles in the near future.

LONG BEACH, CAL.—G. A. Zamboni, of the Bessele patents, is contemplating the erection of a \$75,000 factory here for the manufacture of Bessele devices.

LONG BEACH, CAL.—The National Axle Co. will erect a \$300,000 factory building near Long Beach when suitable location is found. The head offices are located at San Jose.

SAN PEDRO, CAL.—Work will start at once upon Regan Forge & Machinery Co.'s plant to be built at San Pedro. Austin Co. are the contractors. The building will be of steel and brick.

BANNING, CAL.—The King's Food Products Co., of Portland, will erect a \$500,000 dehydrating plant at San Bernardino, according to announcement made by Percy Donaldson, of Banning.

SAN BERNARDINO, CAL.—The Southern California Ice Co. will erect a storage plant at 3rd and I Streets, of brick construction, three stories high, this being the first of the three units to be erected.

BREA, CAL.—The Brea Tool Works have been incorporated at \$50,000 and will erect a factory building at Redwood and Olinda Blvd. W. J. Travers, J. F. Schweitzer, A. D. Yost and M. Burroughs are the incorporators.

RIVERSIDE, CAL.—The Ripley Power and Water Company has incorporated with a capital stock of \$70,000. Directors are J. O. Phillips, A. Vilman, Frank Sabathe, Harris D. Hollenbeck and J. N. Hesley.

LONG BEACH, CAL.—An 11-story apartment building will be erected by F. C. Waterbury on a 100 by 200-ft. site on Ocean Avenue near Atlantic Avenue. The building and furnishings will cost \$1,000,000 and will contain 140 suites, each with bath.

SAN DIEGO, CAL.—An ice cream and candy factory will be erected by Robert Blankenship and Richard T. Robinson, Jr., at 1141 Fifth Street. The building will be 2-story and the equipment includes refrigeration machinery. Total cost estimates at \$75,000.

SANTA BARBARA, CAL.—The Puritan Ice Co. will erect a factory along the Southern Pacific right-of-way and has been incorporated at \$150,000. The incorporators are L. R. Phillips, T. Paul Dalzell and Laurence R. Larabee.

LOS ANGELES, CAL.—The federal government has granted authority for construction of a lighthouse and fog signal station at Point Vicente, near Santa Barbara channel. Bids will be called for soon by the Light House Service. Estimated cost of the structure is \$80,000.

ALHAMBRA, CAL.—Carmel of St. Teresa Convent will construct an addition to the con-

vent and school at an estimated cost of \$200,000, exclusive of equipment and furnishings. The new building will adjoin the present group at Alhambra and Monterey Sts.

THE INTERMOUNTAIN DISTRICT

DENVER, COLO.—The Windsor Farm Dairy Company has completed plans for a \$100,000 addition to its plant at 18th and Blake Sts.

GRAND JUNCTION, COLO.—The Rettig Packing and Market Company has secured a site on which to locate its new \$100,000 packing house.

DENVER, COLO.—The Continental Rubber Products Company, of which E. A. Sidnell is president, is negotiating for a site on which to build a factory.

CONRAD, MONT.—A contract for the building of a flour mill has been let by George Yeager to F. D. Finkenbinder. Work will begin at an early date.

SANTA FE, N. M.—Ground is to be broken at once for a \$150,000 hotel here to replace the De Vargas, recently destroyed by fire. It will be a 100-room building.

DENVER, COLO.—Contracts have been let by the University of Denver for the construction of the new school of commerce in a down-town location at a cost of \$100,000.

GLENVIEW, MONT.—The Northern Pacific Railway will build a new depot here at a cost of over \$200,000. Construction will start as soon as weather conditions permit.

DENVER, COLO.—Ground has been broken for a four-story building, costing \$400,000, which when completed will house the L. R. Steel Co., an international chain store organization.

DENVER, COLO.—The name of Fourteenth Avenue will be changed and a decorative lighting system installed, if a movement headed by Anna Wolcott Vaile, wife of Representative Vaile, materializes.

COLORADO SPRINGS, COLO.—General offices and yards of the W. F. McCue Mercantile Company—a Seattle lumber concern—are to be located here shortly, Grant Hemenway of this city has announced.

LAFAYETTE, COLO.—The Colorado Accumulative Company, storage battery manufacturers, will locate a factory in this city in accordance with an agreement recently made with the local commercial association.

BATTLE MOUNTAIN, NEV.—Robert Paysee, of Portland, Ore., has been awarded the contract for building a high school here. The structure will be of brick, two stories in height, and will cost \$75,000.

MINA, NEV.—The Candelaria Mines Co. will start construction on a new mill as soon as weather conditions permit. The building of an electric transmission line from Mina to Candelaria is to start shortly.

DENVER, COLO.—Secretary of the Treasury Mellon has authorized the construction of a half-million dollar federal reserve bank building at 18th and Curtis St. The work will be directed through the Kansas City bank.

ELKO, NEV.—The Elko-Lamoille Power Company has announced improvements to cost \$50,000, which will include a new power house, equipped with 250-hp. engines and equipment sufficient to supply a town of 5,000 inhabitants.

GRAND JUNCTION, COLO.—The new Western Slope Concrete Products Company plant, just completed here, has been opened. It represents an investment of \$85,000. Howard M. Jay is general manager and Fred McRae is local manager.

DEMING, N. M.—Manufacture of the North Automatic hay baler will be started here within a few days, according to C. S. Cleaver, president of the Mimbres Valley Land & Utilities Company. The factory is to employ between 1500 and 2000 persons.

LIMON, COLO.—A \$15,000 flour mill with a capacity of 50 barrels a day is to be built here by the Equity Elevator Company.

GALLUP, N. M.—Plans have been made by the Santa Fe to spend \$750,000 on improvements in this vicinity. A \$150,000 addition is to be built to the Harvey Eating House and El Navajo Hotel. The main line is to be double-tracked between Gallup and Perea.

HAMILTON, MONT.—A resolution has been passed by the commissioners of the Bitter Root Irrigation District for the purpose of issuing bonds for constructing an irrigation system, including concrete foundations for the flukes. The bond issue will be \$1,140,000.

SHOSHONE, WYO.—Good headway is being made in the construction of the Wyoming Chemical Products Company plant, northeast of here. Seventy per cent of the machinery is on the ground and more than one-fourth of the construction work has been finished.

DENVER, COLO.—The John Elsner Hotel Company, headed by William A. Sharpe, a Detroit manufacturer, and Rosalind Elsner, daughter of Dr. John Elsner, plans the early construction of a seven to twelve-story hotel at 14th and Curtis Street at an estimated cost of \$500,000.

BOZEMAN, MONT.—The South Bench Irrigation District, consisting of between 19,000 and 20,000 acres of dry lands located south of Three Forks and Willow Creek, was created recently. The district expects to construct a dam, with canals and laterals. The cost will be about \$900,000.

CHEYENNE, WYO.—Announcement has been made of arrangements by the Union Pacific to spend \$2,000,000 in Cheyenne this year. Most of the expense will be for a subway at the passenger station while the remainder will be used to extend the freight depot and enlarge the freight yards.

DENVER, COLO.—Plans have been made by the congregations of the North and Emanuel Presbyterian churches for the erection of a church building at West 37th Avenue and Federal Boulevard. The new edifice will be known as the North Presbyterian church and will cost, when completed, approximately \$75,000.

BRIGHAM CITY, UTAH.—Plans are being considered for the establishment of a molasses factory in Brigham City, the purpose of which is to refine the beet sugar stock molasses into a table article. The city now has a large sugar factory on the main line of the railroad, which makes the location here of the new factory an ideal one.

BRIGHAM CITY, UTAH.—At a recent special meeting of the city council, it was decided to install a new lighting system on North and South Main Street. One of the lights has been placed on South Main Street for demonstration purposes. It is the intention of the city council to have the new lighting system installed within the next thirty days.

CARSON, NEV.—Frank Murphy, vice-president of the Virginia and Truckee Railway, has announced that within the next few weeks changes will be made which will replace the steam plant at the shops with electric power. Tentative plans call for the installation of at least seven motors, two of which will be in the machine room. Other improvements will be given final consideration as soon as the electric system is installed.

SALT LAKE CITY, UTAH.—The city commission has voted to advertise for jurisdiction and call for bids for the installation of a residential lighting district on Yale avenue from McClelland street to Fifteenth East, a distance of four and a half blocks. Bids will be opened at 10 o'clock a.m. April 4th. Forty-two ornamental standards will be erected in the four and a half blocks if the proposed improvement meets with the favor of the property owners. Proposals will be asked on cast-iron, steel and concrete standards.

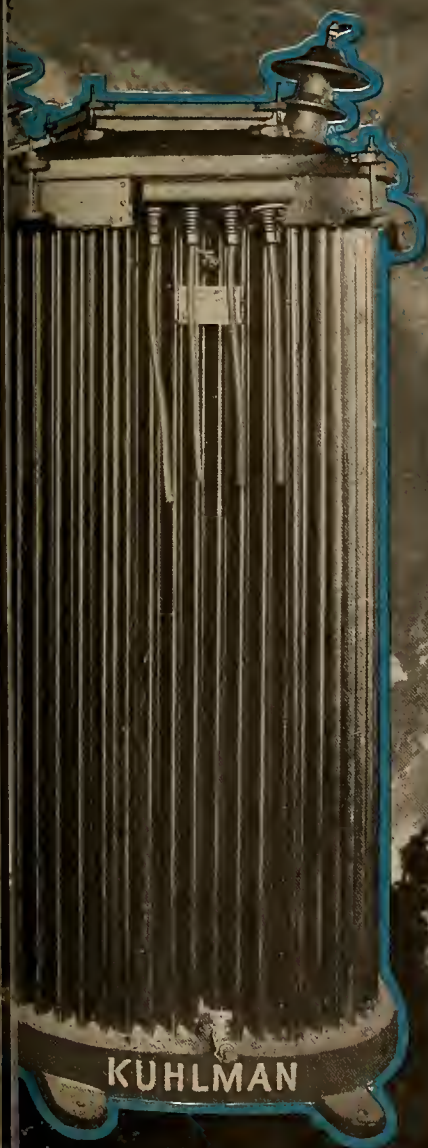
Journal of Electricity and Western Industry

25 Cents a Copy

April 15, 1922

San Francisco

*—typifying the great energy of
the West—to be ultimately
"transformed" into useful ser-
vice to her people far removed.*

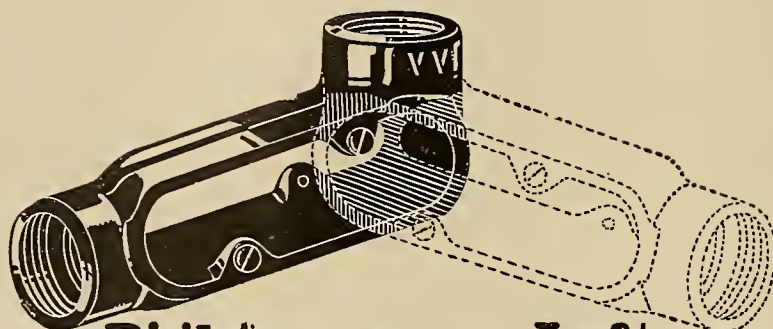


KUHLMAN TRANSFORMERS

—built for efficient service over long periods of years. Available in a wide range of standard sizes for central station or distribution needs, or made to any specifications. Our western engineering offices have specialized service to give you.

KUHLMAN ELECTRIC CO.
BAY CITY, MICH.

District Offices in SAN FRANCISCO, LOS ANGELES, SPOKANE

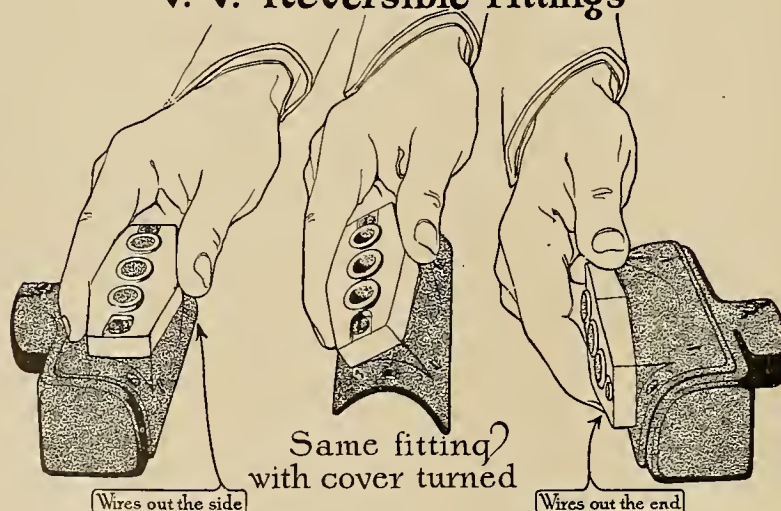


**Right or Left
in one**

V. V. FITTINGS

A Complete Line of Time Savers

**One of the Many
V.V. Reversible Fittings**



Adequate Stocks — Backed by Our Reliable Service

Pacific Coast Distributors

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, APRIL 15, 1922

NUMBER 8

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1922, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

Printed in U. S. A.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Engineering News Record

American Machinist

Power

Chemical and Metallurgical Engineering

Coal Age

Engineering and Mining Journal-Press

Ingenieria Internacional

Bus Transportation

Electric Railway Journal

Electrical World

Electrical Merchandising

Journal of Electricity and Western Industry

(Published in San Francisco)

Electrical Review and Industrial Engineer

(Published in Chicago)

American Machinist—European Edition

(Published in London)

Pacific Mining News Supplement to

Engineering and Mining Journal-Press

(Published in San Francisco)

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.

WASHINGTON, D. C., 610-611 Colorado Bldg.

CHICAGO, 1570 Old Colony Building.

PHILADELPHIA, Real Estate Trust Building.

ST. LOUIS, 713 Star Building.

CLEVELAND, Leader-News Building.

Editorials

297

One Way to Broaden the Cooperative Campaign—The Crisis in Western Transportation—Keeping Books in the Stock Industry—Filling Up the Valleys With a Domestic Load—A Perversion of Logic—Training Schools For Disabled Veterans—More Cooperation Among Wire Using Utilities—A Western Office for the Internal Revenue.

Increasing the Efficiency of Laborers on Construction Work

305

By R. C. STARR

Assumption of individual responsibility and friendly rivalry between crews is as important in the handling of construction crews as good camps, good food and entertainment for the men and their families.

Radical Changes Are Taking Place in Electrical Development

307

By T. E. BIBBINS

The third cycle of electrical development is now at hand and the distributing and selling functions must be stabilized to meet the production of energy and the growing public demand for service.

How California Has Outdistanced Ontario in Economic Growth

310

By ROBERT SIBLEY

Statistical comparison of the growth of California and Ontario indicates that during the past twenty years California has progressed under private initiative while Ontario has been retarded by government ownership.

Importance of Oil as Fuel for Railroads on the Pacific Coast

313

By J. C. MARTIN, JR.

In view of its ability to increase the steaming radius of locomotives railroads will have first call on fuel oil if conservative steps should ever be required.

Western Comment on Current Events

300

Letters to the Editor

302

Radio Bulletins

303

Builders of the West—Markham Cheever

304

Electrification of Gothard Section of Swiss Railways

314

Self Improvement in Salesmanship

315

Increasing Production in Industry

315

Western Dealer Jobber and Agent

319

Activities of the West

322

Meetings of Interest to Western Men

327

Personals

328

Business Outlook in Western Market Centers

330

Manufacturer, Dealer and Jobber Activities

332

Construction News and New Industrial Developments

333

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of California, Rialto Building, San Francisco

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

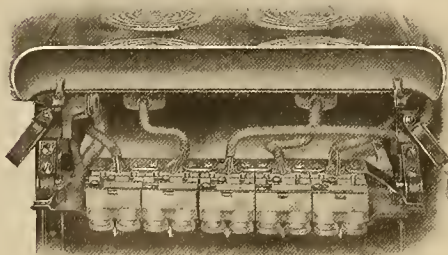
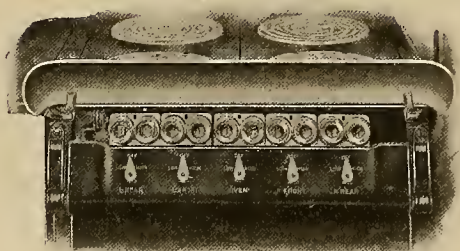
C. M. Lindsay,
Sec'y-Treas.



for
AMAZING
SIMPLICITY



take, for example, the Crawford Switchboard



CONTRAST this with all the other range switchboards you ever saw. Above is the board as it appears in the kitchen, sheltered by a broad nickel rail, with all heat control centralized, and clean, tell-tale switch-buttons to make operation "cook-proof."

At the left—the nickel rail swings up and stays put, revealing the fuses. Each unit is individually fused, and each fuse can be renewed in a moment—no dismantling or tinkering, no time, temper or good-will lost in servicing.

By removing the switch-buttons and turning two simple clamps—with *your hands*,—not tools—the switchboard front swings down on its journal, so you can readily examine the switches.

Swing the whole switchboard forward: behold! Six insulated cables lead away into the range: five to the units, the sixth is the main feed. To illustrate Crawford simplicity, just disconnect all six plugs. Now lift gently—and the entire electrical equipment of the range will come out.

That's real simplicity.

WALKER & PRATT MFG. CO.
BOSTON

Pacific Coast Representative:

BURTON Y. GIBSON, San Francisco

DISTRIBUTED BY

Western Electric Company
INCORPORATED

SAN FRANCISCO

OAKLAND

LOS ANGELES

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 8

SAN FRANCISCO, APRIL 15, 1922

Per Copy, 25 Cents

ONE WAY TO BROADEN THE COOPERATIVE CAMPAIGN

ELECTRICAL clubs and developments leagues, most of them weekly luncheon organizations, have grown to great strength and importance during recent months. In the state of California alone, there are some two thousand electrical men who gather together in their respective communities every week to enjoy soup, salad and a speaker. Is the electrical industry getting enough from these organizations? The electrical home campaigns and the power security drives which were carried out with such success by the San Francisco and Los Angeles clubs are but samples of what these groups could do. Is not the further utilization of this source of energy a possible solution to the problem which faces the cooperative movements of the West?

In an earlier issue, the Journal of Electricity and Western Industry has pointed out the incompleteness of the service which the electrical industry is now receiving. In the end, it must be acknowledged, the fundamental reason for the various cooperative movements, the excuse for the money which power companies, manufacturers, jobbers and dealers put up to support them, is that they will materially increase the sale of current consuming devices. This has been brought about by educating the public and by improving the service of the electrical contractor-dealer, as the channel of distribution through which these wares reached the public. Electrical homes, convenience outlet campaigns, industrial lighting exhibits, field visits to dealer's stores, have meant more wiring and more equipment sold—and the expense of carrying them on has been thoroughly justified.

A careful study of present conditions now reveals the fact that only a portion of these appliances are sold

through electrical retail establishments—and that, however we may regard it, this condition will probably persist. It also appears that the majority of the wiring done in most communities in the West is handled by so-called "curb-stone contractors," who are entirely without the pale of good influence radiated by the local contractors' associations and who are not affected by convenience outlet campaigns or similar educational benefits. An analysis of outlets installed in new homes in one western community, as illustrated on another page of this issue, indicates that the average number has actually fallen off within the past year, in spite of a much better understanding of their importance on the part of the public.

Electrical contractor-dealer associations cannot be expected to handle the situation. They might do something toward it by a broader policy of admitting the outsider. The cooperative campaign, as now organized, is not fully meeting the problem, either. There is some doubt as to whether, as now constituted, with its present finances and restricted personnel, it could deal with the task. Certainly it can only do so, if it can put the industry to work. It has long been acknowledged that the proper function of those directing these movements is to analyze problems and to think up ways of getting people to solve them for themselves. For the executive force of the cooperative league itself to do the work and to hand it to the industry on a silver platter means two failures—it means an accomplishment limited by the staff which can be paid and it means an indifferent industry, failing to take advantage of the work done.

Is not the close amalgamation of the cooperative campaign with the local electrical clubs the desired solution?

The Crisis in Western Transportation

THE entire question of the marketing of western products is tied up with the problem of transportation. At the present time the crisis in the matter of water transportation is very acute. Late last year the Shipping Board had tied up no less than 956 steel hulls and had in actual operation only 420 boats out of a total of 1464. This is illustrative of the more general situation. It is hardly too much to say that shipping rates on the Pacific Coast are thoroughly demoralized. Recent cuts in inter-coastal business have in some instances amounted to more than 50 per cent and in the case of some shipments, all pretense of a published rate has been abandoned.

This disorganization of the water service is important, not alone for itself, but because it raises again the question of the proper adjustments between the coast and intermediate towns. The old water-compelled differential which the coast cities once enjoyed disappeared during the war. It now seems likely to come back for the same reasons which compelled its adoption many years ago. It does not seem probable that the Interstate Commerce Commission will deny the railroads permission to meet actual water competition nor that it will compel corresponding rates to the interior, although it may insist upon setting a maximum differential. If it does anything of this sort, the railroads are not unlikely to be compelled to play the Mississippi Val-

ley against the Atlantic seaboard as a source of supply for western products, thus developing the short haul business which they control, as against the transcontinental traffic which is exposed to water competition. The entire situation is of the greatest importance to the whole western country, affecting as it does the determination of markets in which goods from this territory can compete—and its outcome will be watched with the greatest interest by western producers.

Keeping Books in the Stock Industry

OVER a period of difficult credits and enforced marketing, the principal problem of the western cattle man has been to obtain the money to carry him until better times. This situation as never before has brought out the necessity for the introduction of fundamental business principles into the stock business.

No merchant of any standing would think of doing business without a complete set of books and a knowledge at all times of his financial status—but, in spite of the magnitude of their undertakings, few stockmen know how much they are making on their invested capital, or what their limitations are or should be, in order to make the proper return. They do not keep books as a general rule, except in a small vest pocket note book or on their check stub—and questions of rate of return, not to mention percentage of overhead, do not enter into their figuring.

In order to attain a sound economic position, it is not necessary for the farmers to form a union, nor to ask for or receive any special favors at the hands of state and national legislatures, nor yet to be placed in such a position that they could operate a monopoly in the production and sale of all food stuffs. It will become necessary, however, to educate the young man taking up agriculture along scientific lines, so that he may be able to gage accurately the extent of production which he may safely undertake and know through his accounting whether or not this production is earning him a proper return on his capital invested. He will then be able to make the same showing as a manufacturer of his financial condition and will be in a position to borrow according to his financial requirements at rates of interest not excessive and from sources which are not subjected to violent financial manipulations, making necessary what practically amounts to the enforced sale of the borrower's property.

The West is in the peculiar position of depending for its major prosperity upon industries which are more or less informal in their organization. Agriculture, stock raising, even mining and oil production belong to that class of outdoor, wide-horizoned enterprises which have not faced the immediate necessities of exact business methods. Good business procedure is none the less important to their success—and it is a good thing that the Federal Reserve Bank and other factors which govern present day credits are gradually bringing about a realization of its importance.

Filling Up the Valleys With a Domestic Load

FACED with the prospect of a material loss in revenue last fall, owing to the shutting down of copper mines and smelting plants, the Montana Power Company cast about for a means to fill up the valley in their load. It was impossible to increase the electrical uses of other types of industrials because all were suffering under the business slump caused by the depression in the major industry and most were either shut down, or operating upon part time. The residence load was therefore looked to as a possible source of revenue. It was found that elsewhere more than half the household current consumption occurred between the hours of 7 o'clock in the morning and 7 o'clock at night—in other words, that the use of household electric appliances made up more than half the domestic load.

With this record in mind, the Montana Power Company put on a phenomenal selling drive which, in spite of the reduced purchasing power of the community, resulted in the sale of 4502 appliances in twenty-one days, or more than had been sold in the entire two years previous. The success of the campaign was laid to the effect of educational advertising which preceded it, as well as to the attractive prices and real sales force put into the campaign as it was carried out.

The morals of the story are two—first the market which lies at hand for electric appliances even under the most unpromising conditions, if only the proper advertising dynamite is placed under the sales campaign, and secondly, the unappreciated possibilities which lie in the domestic load. The outstanding feature of power company plans for the coming year is the attention which is being paid to building up the household demand. All of which furnishes another argument for the importance of all work which helps to forward the greater sale of electric appliances.

A Perversion of Logic

IN a published speech in defense of the proposed Water and Power Act of California, by which the state would go into a \$500,000,000 power business, one city attorney remarks:

"If the Great Western Power Company can sell the city of Roseville (Cal.) at one cent a kilowatt-hour and realize a profit, a combination of municipalities could undoubtedly do so. . . . At the above rate to the consumer (a rate ranging from 5 to 2 cents per kilowatt-hour, stated in the context above), the city of Roseville last year made a profit of over \$7,000 and still the power companies claim they cannot make a profit at seven cents to the consumer."

The assumption which the speaker went on to dwell upon, is that under state management all customers would be enabled to enjoy a rate of one cent per kilowatt-hour plus distribution costs. On the face of it, the matter is absurd. The Great Western Power Company is enabled to give the city of Roseville its exceedingly low rate because the power is

delivered wholesale—because it is a relatively stable load—and because other consumers on the line who use small blocks of power pay higher rates. Within the city itself, the city can afford to make its rates low because it does not have to pay for unused power. Were all the customers of the power company upon a wholesale basis, as would be the case were the state furnishing the power, all would be faced with higher rates. Or, if the city of Roseville generated its own power and enjoyed a 60 per cent load factor in place of the present situation which from their standpoint amounts practically to a 100 per cent load factor, they would find that their schedule of rates had to be revised upward.

The city attorney in his speech would leave his hearers with the idea that the power companies at the present time make enormous profits—and what is more, as he cannot fail to be aware that these companies' rates are determined by the Railroad Commission, that there is some measure of dishonesty or collusion involved. As a matter of fact, the power companies perform their service at cost—the cost of labor and materials plus the cost of capital, the profits of investors being strictly regulated and supervised by a body whose integrity and efficiency was recently commended, even by a hostile investigating committee.

The argument bears no weight—but it is dangerous, nevertheless. There are always those in the audience who, knowing nothing of the situation, are ready to believe what they would like to believe—in this case, in the efficiency of government ownership.

Training Schools

For Disabled Veterans

THOSE familiar with the work of the government in training disabled veterans for work which they will be fitted to do on re-entering civil life feel that this has been a creditable page in the country's war record. This training has been given at accredited schools at which the disabled men were supported and from which reports were made regularly to government inspectors. Under this provision, numerous men have completed mechanical courses and many others have well under way courses in university training along lines of their choice.

The Association of Disabled Veterans of the World War now calls attention to the fact that the government is departing from this wise policy in that it is attempting to set up schools of its own in abandoned camps. The report of the investigating committee on conditions at Camp Sherman, where such a school was started, indicate that no satisfactory training can come from this method. In the electrical department of this camp, for instance, the only equipment at hand for study was the few dismantled fans and other odds and ends of electrical machinery which remained from the former occupancy of the camp.

There have been some 250 ex-service men trained in the electrical field in the western states since the close of the war. These men received good

training at accredited schools and the record of their accomplishment is reported through the government inspectors as eminently satisfactory. They have, in short, become useful members of the community. The government's entire object in this training is to bring about such an end—and it would indeed be a false measure of economy, which would not only cheat the disabled veterans of the war of their just due in first-class training, but would thrust out upon the community a dispirited group of poor workmen, inadequately trained and with ambition deadened.

More Cooperation

Among Wire Using Utilities

GREAT as has been the work of joint pole committees of the West and other joint activities of wire using utilities, there is still much that can be done. An outstanding desirable objective would be to perfect a practical working cooperation among wire using utilities on the streets and highways to effect better harmony in design. An encouraging measure of success has already been attained. The West has led the world in matters of cooperative bettering of inductive interference, but there is still need in many of our western communities for the engineers of the several companies to get together to plan their system layouts with due regard to the rights and needs of one another, to promote joint use where conditions are favorable and to avoid conflicting construction, entailing trouble and extra expenditure as well as inharmony in design. It would be well for engineers and executives generally throughout the West to give more thought and study to this important problem.

A Western Office

For the Internal Revenue

ALTHOUGH the suggestion made to the Ways and Means Committee of the House of Representatives that a branch office of the Internal Revenue Department be established on the Pacific Coast, failed of its recommendation on account of the pressure of other business, it is expected that the matter will be brought up again at the next session. The measure has received such support that it is expected at least that regional boards of assessment will be appointed with authority to act upon many questions of tax adjustment which must now be referred to Washington.

This is in line with the western pressure which has continually been brought to bear toward the extension of authority in western branches of government departments. The greatest source of waste in these bureaus occurs from the necessity of continually referring decisions to Washington which results in an absence of the business efficiency obtainable only through a close contact with local situations. One of the most effective ways to bring about economy in government expense, as well as to secure better service for the western states, would be the establishment of such local divisions—and the present suggestion will be followed up by western business men with especial interest.

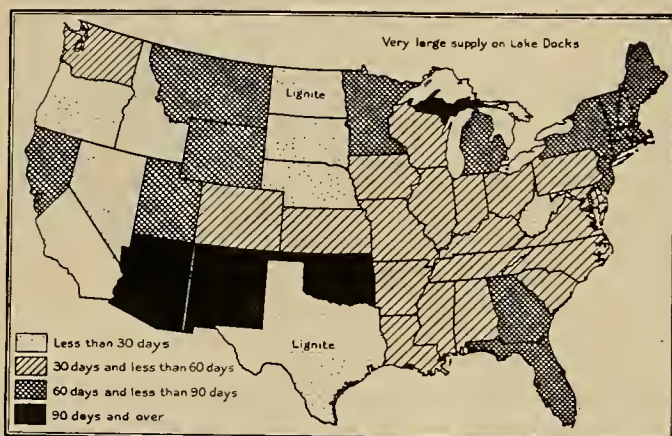
Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Strike Not Serious in Western States

Non-Union Coal Fields Operating and Storage Reported Adequate for Most of the District West of the Rockies

WITH the coal strike actually announced as a fact, the railroads and industries of the nation have been taking count of stock and figuring their exact position in view of the possibility of a protracted siege before a settlement shall have been reached. In such a survey, the West shows up in a particularly favorable position. Fuel oil is used almost exclusively in California, for railroads and industrial purposes alike—and to a lesser degree



shares the burden in adjoining states. Hydroelectric power is also used to a far greater extent than elsewhere in the nation, leaving fewer industries dependent upon coal. In the Northwest, particularly in Oregon, hogged fuel plays an important part in the fuel supply of the state.

Reports from the various districts indicate that fewer mines are affected than was feared. The recent strike settlement in Washington has placed the majority of mines on the open shop basis. From the Centralia district, two mines are reported as closed, with 250 men out of work and production placed at about fifty per cent. Utah mines are not organized and although there has been much activity on the part of union organizers within the past few weeks, it is expected that few men will go out. Wyoming is in a somewhat less favorable position, but is reported to have between two and three months' supply of coal on hand.

On the whole, adequate supplies are in sight in all of the western states, as indicated by the accompanying map prepared by the U. S. Geological Survey—and industrial men are awaiting the outcome without great perturbation.

Growers Praise War Finance Board

Indirect Influence of Price Stabilization and the Creation of Confidence in Banking Quarters Held of Greater Value Than Loans

THE recent western visit of Eugene Meyer, Jr., chairman of the war finance board, demonstrated quite decidedly the importance of the psychological effect of the activities of the War Finance Corporation on western agricultural products. The ultimate prosperity of the greater portion of the states west of the Rockies depends upon their ability to market the products of the soil, and the credit which was placed available to the growers, even though it was not all used, created confidence on the part of the growers and buyers alike.

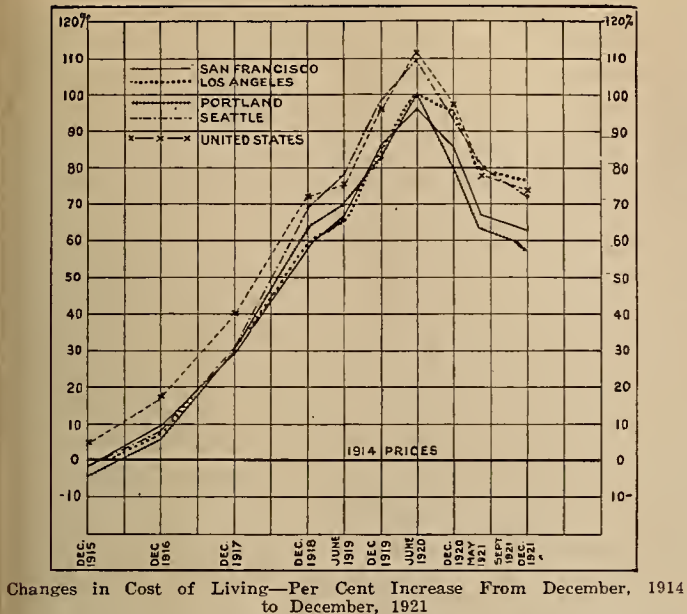
The act under which the War Finance Corporation operates was a war emergency measure which was extended to July 1, 1922, on which date the board's authority to make new loans expires unless Congress provides for a further extension. Western growers want the War Finance Corporation or some similar body continued as an active economic agent on the ground that the emergency which called for the extension of the board's activities into peace times has not passed. It has been repeatedly stated that its indirect influence on the stabilization of the prices of farm products through the creation of confidence in banking quarters was far greater than the direct effect of its loans.

It is held by growers that the financial needs of the various growers of different products present a variety of problems and in most instances demand special consideration. This condition arises from the fact that some of the western products are perishable, the movement of others is seasonal, while the financing of some, such as live stock, must be considered on a long-term basis.

Changes in Cost of Living in the West

Living Costs in Pacific Northwest Have Declined Further, and Are Evidently Still Declining Faster Than in California

CHANGES in the cost of living in the four principal cities of the Twelfth Federal Reserve District, as recently reported by the United States Bureau of Labor, are summarized in the accompanying table and chart. The dates selected for comparison are December, 1914 (in a pre-war normal year), June, 1920 (approximately the high point of the rise in the cost of living), and May, 1921 (the date from which relative stability in prices has obtained).



There appears a gradual flattening out of the curve of declining living costs, which is in agreement with the various national wholesale and retail indices, these having been relatively stable in the past few months. The cost of living in the Pacific Northwest has declined further, and is evidently still declining faster, than in California. In the itemized figures the following facts are noteworthy:

1. The relatively small increase in the cost of food in all cities from 1914 to 1921 and the rebound in food prices since May, 1921.
2. The small increase in the cost of clothing from 1914 to 1921 in Portland and Seattle and continued rapid decline of clothing prices in all cities from May to December, 1921.
3. The noticeably small increase in housing costs in San Francisco since 1914 and the increasing cost of housing except in Seattle since June, 1920.
4. The practically stationary cost of fuel and light in Los Angeles since June, 1920, while costs in other cities were increasing.
5. The very large increase in furniture prices since 1914 and the tendency to maintain prices in this line. A large part of the decrease since the peak of 1920 has taken place since May, 1921.
6. The failure of miscellaneous items* of the budget to decline since June, 1920.

*Miscellaneous items include street car fares, moving picture admissions, newspapers, medical services and medicines, dentist services, spectacles, laundry, cleaning supplies, barber services, toilet articles, telephone and tobacco.

Stabilizing the Western Rice Industry

California Rice Growers' Association Studies 1922 Marketing Situation in Orient to Provide Stable Outlet for Crops

SOMETHING like 800,000 bushels of rice were grown in California in 1914. With the phenomenal demand of the war period and the year just following the war, this production grew at an amazing rate, until in 1920 it had reached a figure of nearly ten million bushels. Very little thought was given to marketing problems which seemed to be solving themselves in the form of an overwhelming demand. This, however, abruptly terminated in 1920, leaving the California rice growers in a precarious financial position. A drastic reduction in acreage and a care-

ful study of market conditions has followed, with the result that the rice industry is now taking its place as a sound, as well as an important department of western agriculture. 1921 acreages were cut down to 120,000 acres, compared to 162,000 in the previous year, with a production of something less than six million bushels. Due to the efficiency of production methods and the much greater yield per acre in California, it is possible for western growers to compete favorably in world markets, so that the present problem is almost entirely one of securing outlets.

An agent of the new Rice Growers' Association is now in Siam estimating probable crops from that center of production and is expected to make similar studies of climatic and economic conditions in India and Indo-China. A representative has been sent to Japan to attempt to build up markets there, the first agent of agricultural interests in the United States ever sent to Japan on a marketing expedition.

California has something more than 250,000 acres of land better suited to rice propagation than to anything else. This cannot be planted to rice continuously, but must have intervals of lying fallow or planting to other crops. On the basis of the active acreage within this area of so-called "hard pan lands," it is estimated that the normal output is in the neighborhood of 4,000,000 bags of rice.

Placing a Foot in China's Open Door

Results of the Washington Conference Will Open Up Wider Opportunities in China For American Pacific Trade

AMERICANS generally have the vague impression that they are very popular with the Chinese and that in consequence American goods must have a favored position in Chinese markets. This is a wrong conclusion from a correct premise. The Chinese do indeed regard the American nation in the light of an especially appointed guardian angel, but as the Chinese have up to date had very little to say about the government of China, this good will has resulted only in personal friendliness. Until the Washington conference American trade actually suffered under special handicaps, almost every other nation operating under so-called concessions which resulted in lesser import duties for their goods.

The report of trade with China for the two years following the war indicates that although the United States has a substantial part in Chinese business, its share is nothing like what would be warranted by the fact that it is the most favorably situated of all the producing centers for the exchange of products with that country. The following table is from a report of the Department of Commerce:

Value and Percentage of Chinese Foreign Trade Taken by Japan, Hongkong, United States and Great Britain in 1919 and 1920.			
Countries.	Value of total trade with China in—		Percentage of total Chinese foreign trade in—
	1919	1920	1919 1920
Japan	\$642,161,110	\$456,408,435	35 29
Hongkong	387,487,375	363,804,715	22 23
United States	287,231,965	258,681,808	17 16
Great Britain	165,089,255	218,355,120	10 14

Letters to the Editor

Bureau of Foreign and Domestic Commerce For American Manufacturers

To the Editor:

Sir: I am taking the liberty of addressing you to request your aid and cooperation in bringing the service rendered by this Government bureau in assisting manufacturers to build up foreign markets, to the attention of your readers. I find that while manufacturers are very desirous of establishing foreign sales organizations and foreign outlets for their surplus production, in a great many cases they do not know where to apply for the necessary information. I am giving a brief description of the facilities of this Bureau offered to manufacturers and exporters in the extension of their foreign trade. I shall greatly appreciate it if you will bring this letter to the attention of your readers.

The Bureau maintains a very extensive organization for the collection and dissemination of foreign trade information. There is no charge for this information except a nominal one for publications. The information is collected in foreign countries by a staff of some three hundred consular officers located in nearly every commercial city of the world: commercial attaches and resident trade commissioners in the principal commercial centers, and a corps of trade experts who are constantly traveling in foreign countries gathering material regarding opportunities for the sale of particular lines of goods. This matter is sent to the main office in Washington where it is carefully digested and placed in a form suitable for distribution to American manufacturers. The Washington office which acts as a clearing house for this information is made up of a number of divisions, the most important of which are the Tariff, Research, Statistical, Latin-American, Far-Eastern, Russian, Commercial Intelligence, Foreign Service, District Offices, European, Near-East and Editorial. The information is brought to the attention of business men through seven district and eighteen cooperative offices located in the principal cities and commercial centers of the United States. This entire organization is at the disposal of each and every business man who has only to make his wants known or bring his foreign trade problems to the attention of the nearest district or cooperative office.

The manufacturer contemplating entering the foreign field can obtain the following data from the branch offices which have been established to expedite the distribution of commercial information, to ascertain the needs of the business men of the country and to establish closer cooperation between government and private agencies interested in foreign trade:

Patent and trademark regulations, foreign tariff information, and preliminary steps necessary before introducing goods.

Best methods of introducing and marketing, and business customs and practices in the various foreign countries.

Lists of importers and dealers and names of firms interested in acting as agents for American manufacturers.

Packing, shipping, documentation and financial details.

Information is also distributed through publications which include a daily trade journal and monthly, quarterly, annual and special bulletins. Announcements of specific opportunities for the sale of American goods abroad and other matters of a confidential character are furnished only through the trade opportunity service of "Commerce Reports" and the confidential bulletins and circulars of the Bureau sent to firms on its "Exporters' Index."

"Commerce Reports" is the medium through which foreign trade information is brought daily to the attention of business men. It contains concise articles on the possibilities for trade in the various commodities in foreign countries, and it keeps the manufacturer informed concerning matters pertaining to his particular business and opportunities for the sale of his particular line of goods throughout the world.

The special bulletins of the Bureau embrace a wide range of subjects. Some present a survey of the entire world market for certain lines of goods, others contain an intensive study of particular fields and special lines; still others furnish a general survey of some country or group of countries. Bulletins have been issued on the cotton goods trade of most every country in the world. Other bulletins deal with hardware, furniture, construction materials, railway equipment, agricultural implements, electrical goods, lumber, shoes and leather, machine tools, paints and varnishes, canned goods, etc. These monographs contain detailed information regarding the character of goods sold, local trade customs, the extent of foreign and domestic competition and the methods of entering the field. Comprehensive handbooks on the most important countries have been issued. Other special publications deal with such subjects as foreign credits, packing and ship stowage. The Bureau has recently issued a commercial travelers' guide to Latin America, and a complete text book on foreign trade sales methods, entitled "Selling in Foreign Markets."

E. G. BABBITT,

District Office Manager.

Bureau of Foreign and Domestic Commerce, San Francisco.

Low Demand High Load Factor Water Heater Favored in Pacific Northwest

To the Editor:

Sir: The use of electric ranges has made some provision for electric water heating a necessity—for without means of heating water for the household, the electric range does not replace the coal range and renders unsatisfactory service.

Efforts to get around this condition have resulted in the formation of various central station policies, so different as to be in some cases diametrically opposed.

This is not caused by local condition as these are, in the main, similar wherever current is generated by large power units. There is remarkable similarity in range rates and in the methods of handling this business throughout the western states.

On the other hand methods and rates for the most important adjunct, of hot water service, runs from the one extreme to the other.

From the central station viewpoint the main features demanded are—revenue and ease of handling.

From the consumer's, these are quality of service, cost of operation and initial cost.

Ideal service from the consumer's view consists of plenty of hot water at any hour of the day, without previous preparation, at a fair rate. For such service he will naturally be willing to pay more per month than for hot water to be prepared as needed.

Many power companies consider such service beyond their power to furnish at a reasonable cost. They prefer to connect a heater of larger capacity, to be switched on for an hour, as at such times when a bath is contemplated.

Such an installation requires from 3 kw. to 6 kw. readiness to serve; has very poor diversity and might return two dollars per month revenue. This is not good service, and while no tank covering is used, the cost of the high demand heater is greater than the combined cost of the low demand heater and tank cover.

The more progressive power companies have placed their efforts at improved tank insulation with a very low capacity heater which operates against the oven or some other part of the range.

The expensive switching apparatus where the water heater is put against the entire range has convinced them that the same benefits are obtained if a double throw snap switch balances one coil against the water heater.

They estimate more profit from the low wattage heater working continuously than from a high wattage heater which is of occasional use.

They also estimate a lower cost to them on a 500 or 600-watt load working 22 hours per day than is charged by them against the intermittent range or similar apparatus.

It seems reasonable that a fixed load could be served all day for less rate than the range rate which at best is three or four hours per day with variable load.

Practice in Spokane is to maintain a highly insulated tank of very hot water for instant use. The small heater balanced against some coil in the range of equal or greater capacity to the end that the total load of range and water heater will never exceed the total load of the range alone.

This heater is on from 22 to 23 hours per day and must not be considered other than metered service though connected outside of meter.

The power companies usually think it good practice to extend a lower rate on this practically 100% load factor than they do on ranges or any intermittent class of service, especially much lower than on the 6000-watt heater used 20 hours per month or less.

Rates on continuous heaters range from one-third to one cent per kw-hr. with a monthly bill of \$1.75 to \$6.00 per month, depending on size of heater and local rate. The average bill is \$3.00 per month. Usual sizes of 500 to 1000 watts.

Rates on the large wattage non-continuous heaters range from one-half to four cents per kw-hr. and the monthly bill averages \$1.80. The usual sizes are from 3000 to 6000 watts.

These heaters are rarely balanced against the range, and must be provided with transformer and line capacity and are only used when a demand arises for hot water. They require an hour and fifty minutes to heat a thirty-gallon tank in a 70-degree room with 6000 watts.

From the foregoing you will gather that if the customer can be prevailed upon to invest in a utility tank his bills will be the lowest possible for the service and he will have hot water on demand. The other alternative is four-ply insulation which gives fairly good results.

A. C. CROWELL,
Arthur-Fowler Co.

Spokane, Wash.

Engineer Commends Stand on Interference with State Railroad Commission

To the Editor:

Sir: I have read with great interest, your editorial in a recent issue of the "Journal," relative to the correspondence between the Governor and the State Railroad Commission regarding the Southern California Telephone Company and the Pacific Electric Railway decisions.

I regard this editorial as a most timely one and one that expresses the truth in a clear and unqualified manner. The "Journal" is certainly to be congratulated for its courage and unselfish desire to further the public good.

I am confident that editorials of this type will do much to waken the public to the situation and stimulate action.

As you are probably aware, this is not the first instance of this kind which has occurred during the past few months.

CHARLES H. LEE,
Consulting Engineer.

San Francisco, Cal.

Radio Bulletins

The Journal of Electricity and Western Industry is sending out each week by radio-telephone a report on the outstanding engineering and industrial developments in the eleven western states, together with a concise review of business conditions in the principal cities in this district. The following excerpts are representative items taken from messages sent out.

Wages of metal workers in the cities adjacent to San Francisco bay will be cut 10 per cent beginning Monday, April 17, as the result of a decision handed down by the California Metal Trades Association. The basic wage of skilled workers will be 64 cents per hour under the new ruling.

Because an area of 10,000 square miles containing a population of 10,000 would be left entirely without transportation facilities, the California Railroad Commission has refused to recommend favorably to the Interstate Commerce Commission the petition of the California-Oregon Railroad to suspend service. The road operates in Modoc and Lassen counties in California and in Lake county, Oregon.

The Western Pine Manufacturers' Association estimates that the 1922 timber cut in California, Oregon, Washington and Idaho will slightly exceed the 1921 cut, indicating that the lumber industry has once again reached normal.

The Key Route Ferry Company of Oakland has issued a call for bids from Pacific Coast shipbuilding yards on the construction of two electrically operated ferry boats which are estimated to cost \$300,000 each. The boats will be equipped with a 1000-kilowatt direct current turbo generator set and direct motors driving the propellers.

General George W. Goethals, builder of the Panama canal, who has just completed a survey of the Columbia Basin irrigation project for the state of Washington, has announced that he will open offices in San Francisco for the practice of engineering. The Goethals company policy will be one of advice, suggestion, direction and financing of big power, water and irrigation projects in the West.

The Federal Power Commission has approved the issuance of a final license to the San Joaquin Light and Power Corporation of California for the construction of a hydro-electric project on the north and west forks of the Kings river. The project includes hydro developments to generate a quarter of a million horsepower and will cost approximately \$50,000,000.

Estimates of the amount of coal on hand in the various states of the West have been prepared by the Bureau of Mines, the U. S. Census Department and the Geological Survey. In Idaho, Nevada and Oregon, the supply is estimated to be sufficient to last less than thirty days. Washington and Colorado have a thirty to sixty-day supply while portions of California and all of Montana, Wyoming and Utah have enough coal to last more than sixty days. Arizona and New Mexico have the largest supplies in hand. The strike is being felt most severely in the coal fields of Colorado, Montana and Wyoming. There are very few union miners in the Utah coal fields.

The following is a general summary of business conditions in the principal western cities:

The cost of living in Portland, Seattle and San Francisco is less than the general average for the entire United States while in Los Angeles it is slightly higher, according to statistics from the Department of Labor covering the period up to December, 1921. Portland with an increase of but 58 per cent over the cost of living in 1914, is lowest on the scale.

The Twelfth Federal Reserve District report for the sales of electricity for January and February shows increased industrial activity throughout the entire district. The average increase in sale of electricity is slightly more than eight per cent.

In the Intermountain district there has been a general rally in business conditions owing to the opening of many of the larger copper mines in the Utah district. Operators have announced that mining activity will increase until the mines reach a fifty per cent normal production.

Builders of the West

AS a rule the niche of the engineer is a quiet one. His work is done and he has retired from the arena before the world has begun to realize the importance of what was under way. He does not sign his task—the evidence of his labors is often hidden away in the mountains or lies in some intangible accomplishment which has made possible work for which another gets credit. And yet, it may fairly be said that there is no other man to whom the West owes so much as it does to the engineer. With special difficulties of distance, of mountainous territory to be covered, of seasonal rainfall and fertile but unwatered deserts, the West in its development has presented a new problem—one which had to be met with new tools. And in the offices of power companies and water works, at city desks and over private drafting tables, the engineer has met each question as it has come up, has acknowledged nothing as impossible but has quietly gone forward building dams which were higher than any before attempted, transmitting power at unheard-of voltages, covering distances which it was thought could not be spanned and laying the foundation for the spectacular progress which the West has enjoyed.

Among the ranks of these foundation builders should be reckoned Markham Cheever, general superintendent and chief engineer of the Utah Power and Light Company. Ever since his first coming to the West in 1906, he has been associated with the pioneer work of development in the Intermountain region. Perhaps more than any other one man, he is responsible for the engineering accomplishments in the hydroelectric field of Utah. He has always been one of the keenest students of western problems and his work as chairman of the Hydraulic Power Committee of the National Electric Light Association which he held during 1920 and 1921 is characteristic of his constructive contribution to this fundamental exploration work which is preliminary to all accomplishment.

Markham Cheever was brought up with a western slant. His father was a mining engineer, for some time located in Colorado, where he did



MARKHAM CHEEVER

Chief engineer and general superintendent of the Utah Light and Power Company, who has directed the engineering work of much of the hydroelectric work of the Intermountain region.

assaying and engineering work in the mining development of that region. Later he became Professor of Metallurgy at Ann Arbor, Michigan. A simple process of reasoning, therefore, is sufficient to arrive at the information that young Cheever wanted to be an engineer, that he entered the University of Michigan in order to become one and that when he was graduated in 1903 his thoughts turned with more or less persistence to the West as the place where he wished to practice his profession.

His first position was that of engineer at Niagara Falls, where he had a part in the construction of the first section of the plant there erected by the Ontario Power Company. Here he remained for three years, not really becoming a westerner until in 1906 he went to Colorado, where he designed and built a 5000-hp. plant for the Telluride Power Com-

pany at Ames. Following its completion he was sent to Grace, Idaho, to take charge of the initial development of Bear River at that point. After two years of such work, he went to Provo, Utah, as assistant chief engineer for the company. When the reorganization of the power industry in Utah came about in 1912, which resulted in the formation of the Utah Power and Light Company out of sixteen smaller companies, Cheever was the man most familiar with the problems of the district—and he was made chief engineer, having charge of all construction work, as well as his other duties. This position he has held ever since, with the difference that since 1917 the title of general superintendent has been added to that of chief engineer.

All of which has had very little effect on him. He is a quiet, unassuming man who plays golf a little, tinkers with his automobile even more, and likes to go off in his car into the gorgeous landscape which is Utah. "One of those who helped," is one of the modest phrases he uses in connection with his work.

To Markham Cheever, then, as one of those who helped and is still helping to work out the master engineering problems of the West, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Increasing the Efficiency of Laborers on Construction Work

Assumption of Individual Responsibility and Friendly Rivalry Between Crews is as Important in the Handling of Construction Crews as Good Camps, Good Food and Entertainment for Men and their Families

By R. C. STARR

Thebo, Starr and Anderton, San Francisco

ONE often wonders why engineers are willing to sacrifice their home life, their health and often-times their lives to make this world a better place to live in. It is not the almighty dollar which leads them on to do the superhuman thing, but the intense human interest they have in doing something constructive, of building a real monument which, better than the granite pillar so often erected to commemorate the life of a great man, will stand forever as a mark of achievement.

In America we have many such monuments which remain today to attract young men into engineering fields. The Eads Bridge across the Mississippi River stands as a monument to the efforts of one of America's foremost bridge engineers. In the West, the Los Angeles Aqueduct brings to the mind of every man the name of "Bill" Mulholland. And so one might go on and name hundreds of similar examples which inspire young engineers to greater and greater deeds of daring and achievement.

All construction men realize that great records are made possible mainly through the efforts of a smooth running organization, and not because of the individual brilliancy of any one man. No man at the head of an organization is capable of "doing it all," but the most successful man in the construction game is the man who can gather around himself a group of men who will follow the example set by their immediate superior and who will work together like a well oiled piece of machinery.

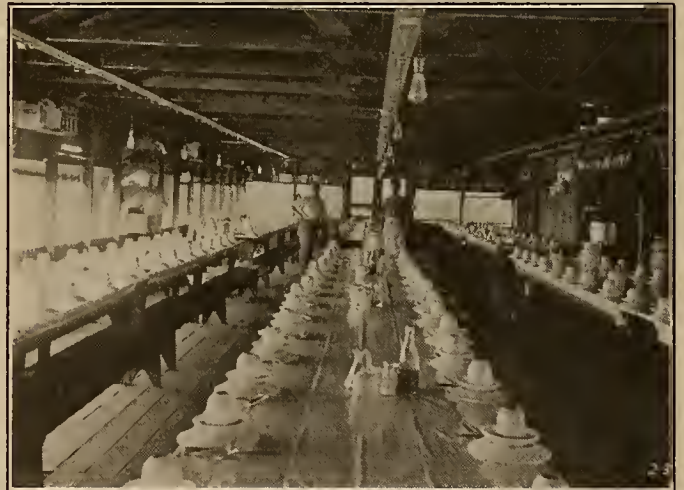
If a spirit of friendly rivalry can be instilled in an organization, in which each man is given a definite responsibility, and every individual who is ambitious loves responsibility, that organization, if properly controlled and properly led, must be successful. Every individual resents being continually outdone by others. Add to this the feeling in each man, no matter how simple his task may be, that he must shoulder a certain amount of responsibility and his interest is at once aroused. Although it may be true that some men shun responsibility, this can often be traced to the fact that they never have had the chance to assume any, and therefore lack confidence in themselves.

A man's pride in his work develops with his sense of responsibility for the work done, and the class of work improves also. The man who has no pride in his work, and who is willing that others should assume responsibility that is rightfully his own, cannot last long in any position where he must direct others. Every firm has its methods of doing certain kinds of work, and any individual who persists in disagreeing with the policies or methods adopted causes dissension which materially reduces

efficiency. For that reason it is sometimes better to place young men in certain positions, even when their experience in that line of work has been far less than that of older men who are available, because the young men can adapt themselves more easily, and because of their inexperience they are not bound by habits learned in other organizations.

It is a comparatively easy matter for a man to do just what he is told to do, and nothing more, for then he is reduced to the status of a machine, and no thinking is required on his part. But the man who can see what is to be done and does it, is of greater value, not only to himself, but to the organization, for it raises his estimate of himself, and gives him confidence and initiative.

All men who are on a construction job, or in any other business, naturally look to those above them



View of mess hall in one of the San Joaquin Light and Power Company's construction camps. In construction work the cooks are often largely responsible for the esprit de corps of the camp.

to gain their standard of what a day's work constitutes. When a new man comes into an organization, the attitude he holds towards his job, and the spirit with which he enters into his work are determined largely by the men around him. It is easy for him to get into the habit of doing things in a slipshod fashion if he sees others around him doing the same. He watches his associates and their effort measures to a great extent just how much he is willing to do himself. Even a man who is naturally inclined to be industrious will fall into the habit of being careless with his work, if he sees that he is doing more than anyone else. And it seems to be a fact that a man's interest is in direct proportion to the amount of work that he is required to do.

When a large number of men are employed in one place, a spirit of friendly rivalry can be developed between the different groups which are doing

similar work on jobs which are nearing completion at the same time. This is true only when the men are interested in their work, and are content with the conditions under which they must live. Good camps, good food, and forms of amusement and entertainment must be provided for the men and their families. Without these things no construction work

house were ready, and not a minute's delay occurred. The most remarkable thing about this achievement was that not a man grumbled nor asked for extra overtime pay and yet in the riveting gang some of the men did not go to bed for three days and nights, so interested were they in being ready when the water was first sent through the tunnels.



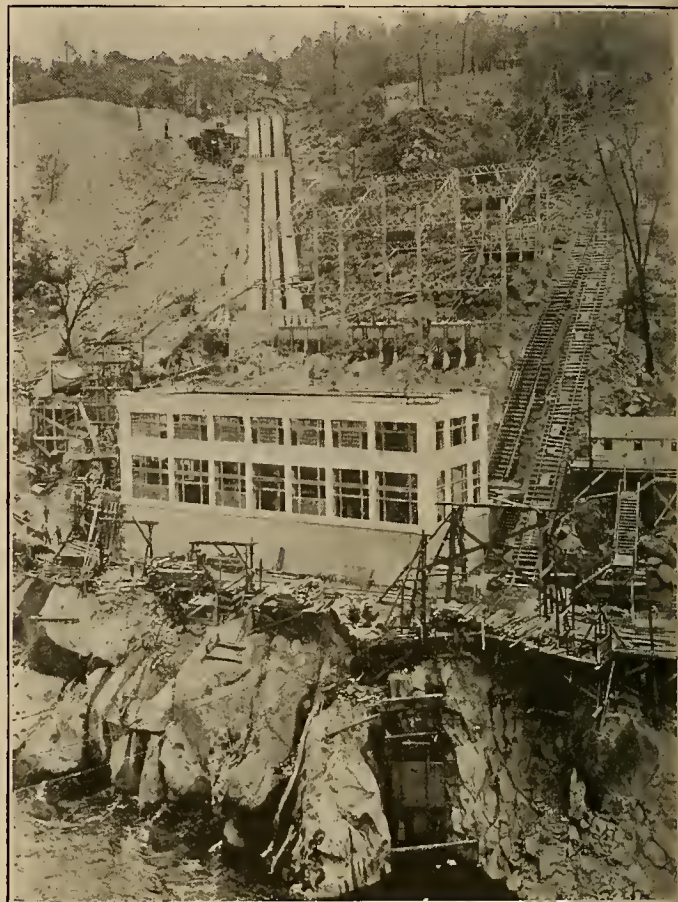
The tunnel crew which was first to break through on adit No. 2 of the Kerckhoff power development. The instilling of a spirit of friendly rivalry between the crews, by posting the daily progress in each heading, served to keep the work progressing at top speed.

can be successful. Three of the men most responsible for the early completion of the Kerckhoff and Kern Canyon Developments were the three main cooks, who have been with me almost continuously for ten years.

In tunnel work the posting of the daily progress in each heading serves to increase rivalry between tunnel crews, and quite often I have seen a tunnel mucker or driller go to the resident engineer's office with a disappointed look on his face to complain because the daily report had not been posted, or because the engineer had not given the crew full credit for the footage drilled and mucked.

The best example of friendly rivalry I have ever seen, occurred on the Kerckhoff Power Development in July, 1920, with the thermometer registering from 100 degrees to 110 degrees Fahrenheit in the shade. The last shot in the long tunnel had been made on July 20th and the electricians were endeavoring to complete the work in the power house.

The riveting gangs had been working day and night to complete the penstocks which had been delayed in the fabricating shops in San Francisco. The hydraulic machinery was being hurried along and at the same time rumors were being circulated that caterpillar tractors were being used to remove the rails, ties, pipe, and debris from the tunnel; meanwhile materials to plug the adits were being delivered. As a result, although all the material in 8500 feet of the 18-ft. by 18-ft. tunnel was removed and bulkheads built at the adits in 13 days, when the water was turned through the Kerckhoff tunnel on August 3rd, 12 days ahead of the scheduled time set less than two weeks before, the penstocks and power



General view of the Kerckhoff power house just prior to completion. This project was completed in record time under adverse climatic conditions.

Many such examples of the intense human interest displayed by even the laborers on a job might be cited. One in particular, which I think is typical of how men in all walks of life are pleased when they see a job well planned and successfully executed, occurred daily at Camp No. 4 on the Kerckhoff Development. All of the power house machinery was delivered by caterpillars hauling 10-ton tractors. The laborers, carpenters, mechanics, electricians and others were all hauled up the incline for their meals, and it so happened that nearly every day, as the car loaded with men came up over the hill, the caterpillar would come down the steep road grade with its loaded trailers and the men, 25 to 30 of them at a time, would whoop and halloo in unison to express their satisfaction at the performance of a single man handling a string of six trailers and their 60-ton loads. Such a performance cannot but help make one feel that after all even a laborer takes pride in real accomplishments, even though his task may be a very menial one, and at the same time it makes all of us who have had charge of big work feel proud that such men really have a personal pride and are not working entirely for the American dollar.

Radical Changes Are Taking Place in Electrical Development

The Third Cycle of Electrical Development is Now at Hand and the Distributing and Selling Functions Must be Stabilized to Meet the Production of Energy and the Growing Public Demand for Service

By T. E. BIBBINS
President, Pacific States Electric Company

THE electrical industry is not yet a stabilized business. The function of producing and transmitting energy has been developed to a high degree of efficiency, supported by marvelous engineering facilities. The manufacturing and engineering elements of the industry have progressed efficiently and rapidly and have established new records for American ingenuity and craftsmanship, but the distributing and selling functions have not been stabilized to meet either the growing public demand for electrical service or the ability of the power companies to deliver current.

Manufacturers have developed engineering skill to the point where they have been able to meet all of the technical requirements of Service. Power companies have met the problem of producing and transmitting energy. But wholesalers and retailers of devices and appliances have devoted almost their entire time to the education of each other in an effort to develop business formulas for the sale and distribution of merchandise, without due regard to the basic requirement of public interest.

These activities have been most important and quite necessary to progress, but now the time has come when if the business is to grow so as to be of satisfaction and profit to the men engaged in it, and, what is more important, if it is to be of complete value to the public, the public must be included in all active plans of development.

The one and only asset of the electrical business is the outlet—the power outlet in industry and the convenience outlet in the home. Installed behind, attached to and flowing through the outlet is the only source of income on the investment of more than two billion dollars in the electrical industry.

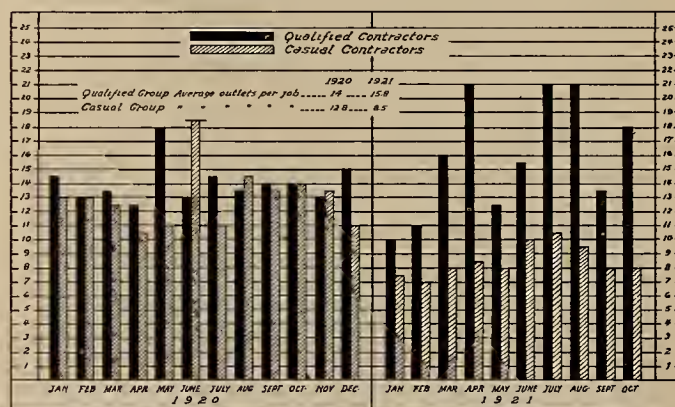
The greater part of the effective thinking of the entire industry in the past twenty years has been applied to the problems of meeting the technical and mechanical requirements of service. During this period there has been no practical anticipation of the need for stabilizing and refining the methods of distributing electrical merchandise and current consumption, based upon the simple hypothesis of treating the outlet as the controlling factor and income producing element of the business.

In the present status of the electrical business, the control of the number of outlets installed on each job is practically concentrated in the hands of the electrical contractor. In the contractor's contact with the owner is determined the sum total of the potential assets of the business—the number of outlets to be installed.

A citizen who purchases, builds or rents a house wired for the use of electricity is entitled to the

complete service which a competent job of wiring implies. As the matter stands today, at least seventy-five per cent of such buildings are equipped with "step ladder" installations only. In other words, the occupant is compelled to stand on a chair, or remove a lamp from its socket, to get any approximation of use from the current delivered. It is estimated that twenty-five per cent of the convenience appliances sold in this territory are not in use because of inadequate wiring.

In the past the contractors on the Pacific Coast have been dividing themselves into two groups, one consisting of qualified contractors, who do business on the basis of good workmanship, standard materials and fair prices, and the other group composed of irresponsible casual contractors, who deal entirely upon the basis of price.



In considering the average number of outlets installed per job by the two groups of contractors, attention is directed to the fact that the material decrease in the 1921 performance of the Casual Group is not due to any great fluctuation in monthly averages, the variation being limited to between 7 and 10½ outlets per job. On the other hand the figures appear to clearly indicate that the 1921 difference between the two groups cannot properly be attributed to the Qualified Group securing a large proportion of the industrial and mercantile jobs, since the record of the Casual Group for 1920 shows an average performance of only a fraction more than one outlet difference to the Qualified Group. Upon this hypothesis, therefore, the obvious conclusion must obtain that the Casual Group are decreasing the number of outlets per job with the definite objective of reducing installation charges to the public regardless of service requirements of the house owner.

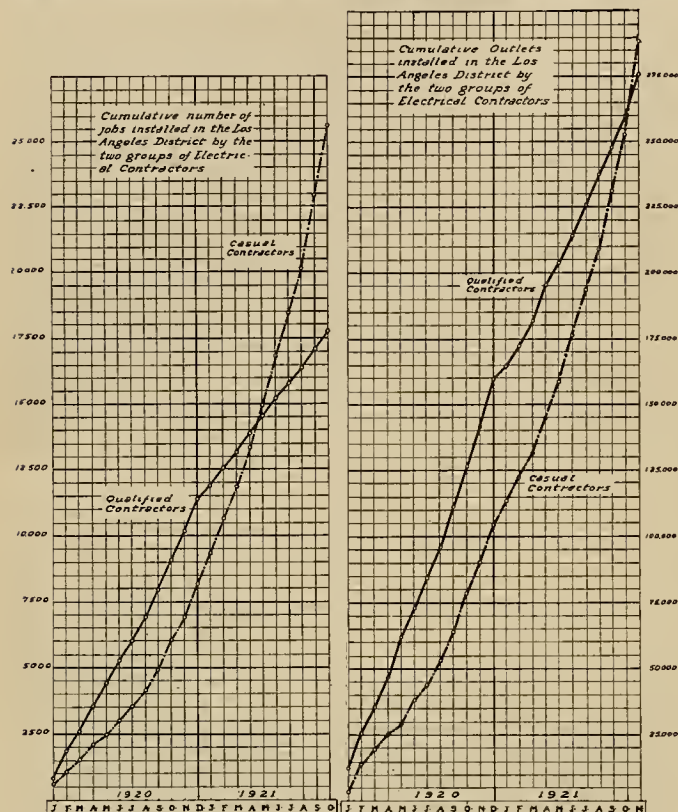
A survey of the Los Angeles territory, for instance, shows that qualified contractors during 1920 obtained about fifty-eight per cent of the total number of jobs, installed sixty per cent of the outlets and averaged 14 outlets per job. In 1920 the other group of contractors obtained forty-two per cent of the jobs, installed forty per cent of the outlets and averaged 12.8 outlets per job. In 1921 the qualified contractors obtained only twenty-seven per cent of the jobs, installed only thirty-nine per cent of the outlets, but averaged 15.8 outlets per job. The other group in 1921 obtained seventy-three per cent of the jobs, installed sixty-one per cent of the outlets, but only averaged 8.5 outlets per job.

The obvious deduction from these facts is that the irresponsible contractor is definitely reducing the potential market for all electrical products and service by failing to take advantage of the natural demand. What is more important, he is imposing unsatisfactory service upon the public.

The difficulty is that the average person knows nothing about contracting service, except in the terms of cost. The lowest bidder gets the job, because the public believes that if there is a difference

to the point that the basic element of electric service—the installation—is competently furnished on the basis of quality, new merchandising channels will have to be established.

It is conservatively estimated that the difference between an adequate number of outlets and the actual number installed on the Pacific Coast in 1921, counted in terms of contractors' cost of material and labor, is three and a quarter million dollars. This estimate does not include the increment of income



The conditions as developed in relation to the outlets installed by the two groups of contractors show a still greater variation when interpreted in terms of jobs installed. In 1920 the two groups together installed a total of 19,553 jobs in the Los Angeles district, of which 11,359 or 58% were installed by the Qualified Group. The Qualified Group therefore entered 1921 with a cumulative lead of 3165 jobs. Five months later, however, the Casual Group had not only eliminated this lead but had passed it with a cumulative total of 14,962 jobs against 14,514 and November first led by 7870 jobs—the cumulative total then being 25,608 jobs for the Casual Group and 17,738 for the Qualified.

In 1920 the Qualified and Casual Groups of electrical contractors in the Los Angeles district installed a total of 264,112 outlets, 159,364 of this number or nearly 61% having been installed by the Qualified Group. The Qualified Group therefore entered 1921 with a lead of 54,616 outlets, but this margin was steadily decreased by the Casual Group until in October of 1921 they led by only 6934 outlets. In November the Casual Group installed 125% more outlets than the Qualified Group and then increased their lead with a cumulative total of 238,882 outlets as against 275,999.

of \$50.00 in the cost of installation that difference goes into the pocket of the contractor as profit. This method of doing business is contrary to the buying habits of the American people. All successful merchants in other lines deal upon the basis of quality, not price. Therefore, since the consuming public does not know the facts, and the qualified contractor has not demonstrated his ability to get his story over to the public, it becomes necessary for manufacturers and distributors to take steps to educate the public.

Otherwise, within the next decade public interest will demand a change in the terms and methods of distribution. Unless confidence can be established between the electrical contractor and his customer

JOBS INSTALLED FROM JAN. 1, 1920, TO NOV. 1, 1921, BY THE TWO GROUPS OF CONTRACTORS IN THE LOS ANGELES DISTRICT.

Month	Qualified Group		Casual Group	
	Jobs Installed	Cumulative Total	Jobs Installed	Cumulative Total
1920				
Jan.	868	868	623	623
Feb.	1019	1887	511	1134
Mar.	702	2589	386	1520
Apr.	944	3533	579	2099
May	862	4395	370	2469
June	850	5245	529	2998
July	757	6002	498	3496
Aug.	891	6893	648	4144
Sept.	1066	7959	799	4943
Oct.	1085	9044	1054	5997
Nov.	1111	10155	850	6847
Dec.	1204	11359	1347	8194
1920 Average	946.6 (58%)		682.8 (42%)	
1921				
Jan.	508	11867	1096	9290
Feb.	689	12556	1333	10623
Mar.	603	13169	1182	11805
Apr.	653	13812	1493	13298
May	702	14514	1664	14962
June	674	15188	1813	16775
July	554	15742	1640	18415
Aug.	548	16290	1690	20105
Sept.	780	17070	2788	22893
Oct.	668	17738	2715	25608
Average for 22 months	806.3 (41%)		1164 (59%)	
1921 individually		6739		17414
Average	531.6 (27%)		1451 (73%)	

Note that in the casual group the average number of jobs installed per month in 1921 is 113% greater than their 1920 performance, and that the number of jobs has increased steadily from January of 1921. Compare these factors with the performance in the qualified group.

OUTLETS INSTALLED FROM JAN. 1, 1920, TO DEC. 1, 1921, BY THE TWO GROUPS OF CONTRACTORS IN THE LOS ANGELES DISTRICT.



Month	Qualified Group		Casual Group	
	Jobs Installed	Cumulative Total	Jobs Installed	Cumulative Total
1920				
Jan.	12528	12528	8171	8171
Feb.	13313	25841	6691	14862
Mar.	9338	35179	4794	19656
Apr.	11616	46795	5579	25235
May	15413	62208	4065	29300
June	11052	73260	8913	38213
July	10962	84222	5466	43679
Aug.	12067	96289	9511	53179
Sept.	14770	111059	10686	63865
Oct.	15395	126454	14684	78549
Nov.	14737	141191	11660	90199
Dec.	18173	159364	14549	104748
1920 Average	113280 (60%+)		8729 (40%—)	
1921				
Jan.	5180	164544	8377	113125
Feb.	7596	172140	9008	122133
Mar.	9585	181725	9739	131872
Apr.	13503	195228	13019	144891
May	8634	203862	13414	158405
June	10609	214471	17596	176001
July	11630	226101	17340	193341
Aug.	11471	237572	15944	209285
Sept.	10621	248193	21924	231209
Oct.	11965	260158	22015	253224
Nov.	15841	275999	35668	288882
Average for 23 months	12000 (49%)		12560 (51%)	
1921 individually		116635		184134
Average	9720 (39%)		15345 (61%)	

Attention is directed to the fact that in no single month during 1920 did the outlets installed by the Casual Group equal those installed by the Qualified Group. Starting, however, with Jan. 1921 and excepting only the month of April the reverse has been the condition, and beginning with May the lead of the Casual Group has in general been steadily increasing. Thus in May the Casual Group installed 56% more outlets than the Qualified, 65% in June, 49% in July, 39% in August, 106% in September, 84% in October, and 125% in November.

All this points to a definitely adverse condition rather than to factors introduced by periodic fluctuations in the relative performance.

which would accrue to the power companies for an indefinite period of time.

The social and economic life of the community is being seriously affected by the incompetence of the present methods, and if the electrical industry is to become stabilized and properly rounded out, it will be necessary for all of the producing and distributing factors of the industry to develop ways and means of meeting the public problem of complete installation service.



The Cost of the Lowest Bid

NOWHERE does false economy exact such heavy penalties from the inexperienced as it does in the employment of electrical contracting service.

The difference in the bid of the qualified, responsible electrical contractor and the irresponsible is usually only about one-half of one per cent (\$50.00 on a \$10,000.00 house.)

And the householder who thinks that \$50.00 worth saving will eventually spend five times as much in repairing faulty materials and workmanship or installing additional outlets whose omission made the lower bid possible.

The use of materials of quality and high standards will in a large measure determine the reliability and integrity of the electrical contractor.


Look for the "check" seal on electrical appliances and materials. This standard electrical merchandise, chosen from the markets of the world, inspected and certified, is distributed through qualified contractors and dealers.

The Pacific States Electric seal is, therefore, a guide not only to reliable electrical appliances and installation materials, but also helps to identify the competent contractor.

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

You will never see any householder "The Electrical Seal" for Householders, which describes how some of their materials and appliances are used in the course of a typical day in an electrical home. It may be obtained free from any contractor or dealer displaying this seal.


Look for this Seal

The Cost of the Lowest Bid—this advertisement shows the folly of employing cut-rate electrical contracting service, pointing out that the bid of the qualified, responsible contractor is seldom more than 1/2 of 1% higher.

Public Education Necessary

From my point of view this means that more effort and cost must be applied to public education. The qualified contractors of every community are worthy of public confidence, and entitled to the consideration that comes with the understanding of the difference between quality service and contracts which are let upon the basis of price only.

The buying habits of the public are normally exercised in favor of this condition, and I firmly believe that as soon as the public realizes that a bid for electrical work based upon good workmanship, standard material and fair prices is the only kind of bid worth considering, the status of the contractor will become established and complete installations will become the rule instead of the exception, as it is today.

The difference between a competent installation made by a qualified contractor and the cut-price kind is only about one-half of one per cent of the value of the building—\$50.00 on a \$10,000.00 house. When

owners are brought to understand that this difference in cost carries completeness and permanent satisfaction in the use of electricity, and is not merely an additional profit to the contractor, confidence will be established and the business will take a normal course toward proper development.

Such public education, I believe, can be accomplished only through broadcast newspaper advertising, and no single company or organization can hope to completely accomplish the results single-handed.

The Pacific States Electric Company, beginning March 1, 1922, is undertaking such a campaign, covering the daily newspapers of the principal cities of its entire territory, reaching over 700,000 people twice a week for the balance of the year. The object of this campaign is to establish a relationship of confidence between qualified contractors and the public, believing that the entire industry, including contractors, manufacturers, and distributors and retailers of standard material and appliances, and the power companies will benefit from this effort. Furthermore, it is expected to meet the crisis which has come in the wholesale end of the electrical business, whereby unless the channels of distribution are opened for a free flow of electrical merchandise, the distributor, as well as the retailer and contractor as we know them today, will not continue in business.

Public Must Know the Facts

Sub-standard materials, cut-price installations, based on less than fifty per cent of a complete job, are leading to economic chaos in the electrical business. The standards cannot be raised without public consent, and the public will not give their consent until they know the facts. A sufficient number of people must be told the facts often enough to have a specific effect.

No industry could be considered as developing soundly so long as one of the most important factors in it has not been able to accumulate a surplus as a basis of credit, therefore the other factors who are now looking to the contractors to open channels of sales are depending upon an unstable condition.

It is necessary to increase the volume of contracting business per job to a point where it competently serves the public, and produces a fair profit to the contractor before the electrical business can be considered as becoming stabilized and sound for anybody engaged in it.

Contractors themselves are not financially in a position to educate the public, and a third party, such as manufacturer, distributor or power company, is in a better position to do so in any case, because they can operate over a larger territory and their effort should have more effect in establishing public confidence in the contractor than his own advertising would develop.

We believe that contractors generally will keep faith with the public, and will meet public confidence with good workmanship, standard materials and fair prices. Unless this is so the outlook is very discouraging and the electric business will not proceed in anything like proportion to the inherent and potential existing opportunity.

How California Has Outdistanced Ontario in Economic Growth

A Statistical Comparison of Growth During the Past Twenty Years Indicates that California has Developed Remarkably Under Private Initiative while Ontario Has Been Retarded by Government Ownership

By ROBERT SIBLEY

Editor, Journal of Electricity and Western Industry

PROPOSONENTS of the proposed Water and Power Act, the initiative measure to be passed upon by the voters of California at the election in November, 1922, cite as an example of the benefits of government ownership the results obtained in the Province of Ontario, Canada, where government ownership and operation of hydro-electric energy has been in force for the past twenty years. In fact, the proposed California scheme is modeled upon the Ontario plan, the economic sanity of which is questioned by many prominent engineers. The success of the Ontario scheme is declared to be "phenomenal" by its advocates, but viewed in the light of the accomplishments of twenty years and compared with the progress of California during the same period of growth, the latter district is seen to have surpassed Ontario in agriculture, commerce and industry.

In fact, statistical comparisons throughout the twenty-year period since Ontario assumed the yoke of government ownership show unmistakably the effect of the superiority of private initiative, soundly regulated.

Prior to the publication of the 1920 census reports California had never been regarded nationally as a great manufacturing state, but the returns showed this state to be the fifth state in number of industrial establishments and eighth in value of manufactured products. From the statistical data accompanying, it will be seen that California, while having less capital invested has a greater value of manufactured products.

MANUFACTURING AND INDUSTRIES

ONTARIO*				Persons Employed
Year	Number	Capital Invested	Value Product	
1905	6,163	215,000,000	241,500,000	184,000
1910	8,000	391,000,000	361,372,000	239,000
1915	6,538	947,000,000	580,000,000	244,000
1918	15,365	1,508,000,000	1,809,000,000	334,000

*Reference: "Canada Year Book 1920."

CALIFORNIA:*

Year	Number	Capital Invested	Value Product	Persons Employed
1904	6,838	283,000,000	367,000,000	120,000
1909	7,659	537,000,000	530,000,000	142,000
1914	10,057	736,000,000	713,000,000	177,000
1919	11,943	1,333,000,000	1,981,000,000	297,000

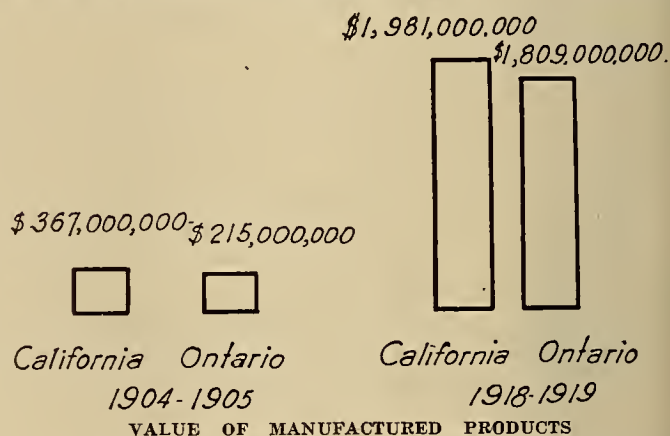
*Reference: "U. S. Census."

Note on the accompanying chart California's wonderful growth in population as compared with Ontario. California starts the century with 25 per cent less population and winds up the double-decade with 21 per cent greater population, or over 600,000 more people than the Province of Ontario.

No section of country, no matter what its industrial progress may be, can endure without development of its agricultural resources. What has

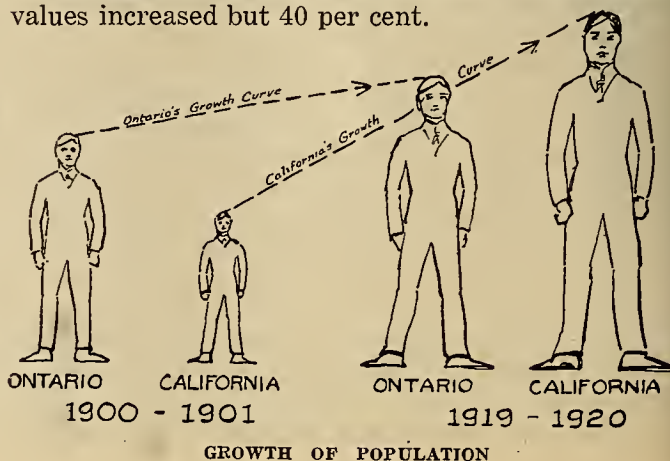
happened in the double-decade under consideration? California starts out with 707,000 and in 1920 has over a million in her rural communities. Ontario, on the other hand, had in 1901 almost one and one-fourth million people in agricultural districts. This number declined to one million in 1920, a decline of almost 20 per cent.

And what are the comparative statements of the value of crops in this double-decade period? In twenty years California crops increased in value 344 per cent, while the increase in Ontario was only 240 per cent.



A comparison of the number of livestock shows that in California livestock increased in value 230 per cent, while Ontario increased only 51 per cent.

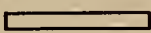

A comparison of farm values which is graphically illustrated in the chart on the next page shows that the value of farm implements increased 540 per cent in California and only 85 per cent in Ontario. Similarly, farm buildings increased 278 per cent in California and only 37 per cent in Ontario. A striking increase is shown in land values in California, a percentage increase of 342 per cent, while Ontario values increased but 40 per cent.

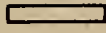





During the twenty years under discussion farms as a whole—land, buildings, implements, livestock—increased in California by 331.5 per cent, with only an increase of 63.2 per cent in Ontario, as indicated by the following tabulation:

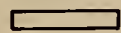

FARM VALUES*					
CALIFORNIA			ONTARIO		
1900	1920	%	1901	1918	%
795,311,000	3,431,000,000	331.5	1,001,000,000	1,634,000,000	63.2
*Reference: "Heaton's Annual 1921." "U. S. Census 1900-1920."					

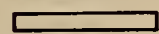

Finally, what has happened to the number of farms in this period? In California they increased

<u>Crops</u>		
California		344
Ontario		240

<u>Livestock</u>		
California		230
Ontario		51

<u>Implements</u>		
California		540
Ontario		85

<u>Buildings</u>		
California		278
Ontario		37

<u>Land</u>		
California		342
Ontario		40

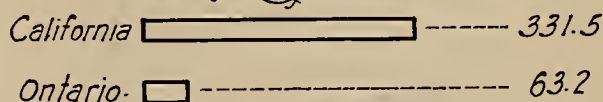
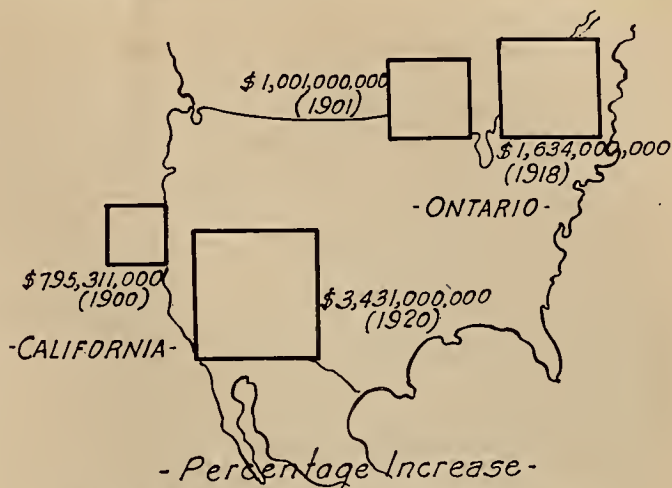
PERCENTAGE INCREASE IN FARM VALUES 1920 OVER 1910

by 62 per cent, while in Ontario they actually decreased 24 per cent.

And what effect does this method of thinking have upon the funded debt? California today has only a funded debt of \$14.67 per capita, while Ontario has \$40.51.



Turning from the farm to building in general, what is the situation? Fifteen of California's foremost cities had a building record of \$140,000,000 in 1920 compared with Ontario's \$47,175,000, and the 1921 record, from such statistics as we have available, shows an even more astonishing record.



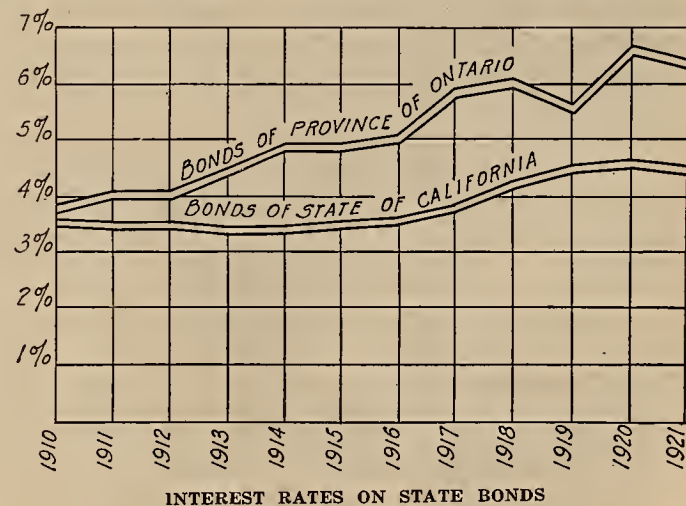
ALL FARM VALUES 1900-1920

BUILDING PERMITS*		
	15 Principal Cities CALIFORNIA	15 Principal Cities ONTARIO
1916	54,000,000	20,229,000
1917	51,000,000	17,385,000
1918	35,000,000	21,477,000
1919	67,000,000	40,585,000
1920	140,000,000	47,175,000

*Reference: "Canada Year Book 1920."
"Bradstreet's 1916 to 1920."

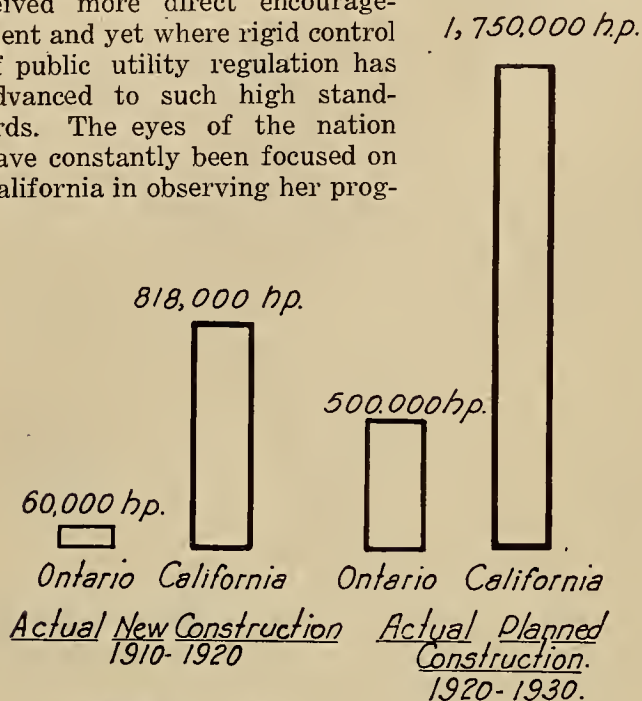
And all this affects the financial borrowing power of a commonwealth. Note Ontario's 1921 rate of 6.25 compared with California's rate of 4.50 which has recently dropped to 4.25 per cent.

INTEREST RATES		
	Bonds of Province of Ontario	Of State of California
1910	3.90	3.60
1911	4.00	3.40
1912	4.00	3.40
1913	4.40	3.30
1914	4.90	3.30
1915	4.90	3.40
1916	5.00	3.50
1917	5.90	3.80
1918	6.00	4.20
1919	5.60	4.40
1920	6.60	4.60
1921	6.25	4.50



It is little wonder then that the twenty-year period ends with California having an assessed valuation of \$4,555,000,000 as compared with Ontario's \$2,054,000,000.

In conclusion it is to be remembered that California's remarkable record of accomplishment in industrial, agricultural and commercial growth has been one of marked individual accomplishment. In this twenty-year period California has become noted for her great cooperative selling organizations, yet it is doubtful if anywhere in the world can there be found a district where individual initiative has received more direct encouragement and yet where rigid control of public utility regulation has advanced to such high standards. The eyes of the nation have constantly been focused on California in observing her prog-



HYDROELECTRIC CONSTRUCTION, ACTUAL AND PLANNED

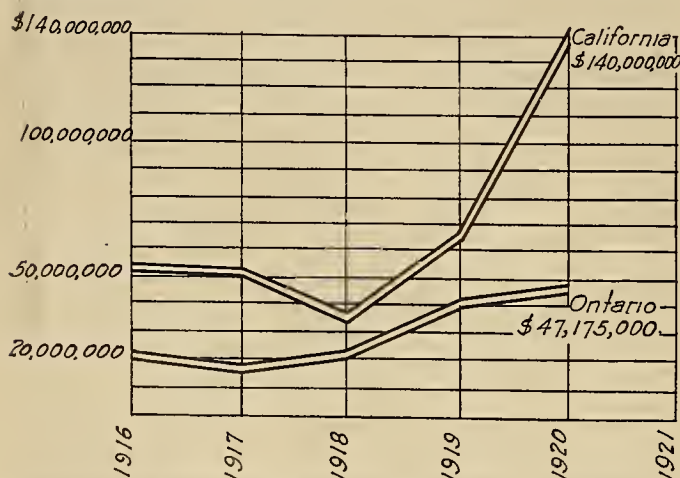
ress in public utility evolution throughout this as well as many other outstanding accomplishments.

I do not wish to be understood as saying that California has advanced so far that perfection has been reached. Far from it. I fully realize that our great utility companies must be led to higher and higher ideals in service to the public. They must vastly simplify their present rate schedules so that the man in the street may understand how his charges for electric service are determined. The hand of our railroad commission must be vastly strengthened. It must be made the equal in dignity

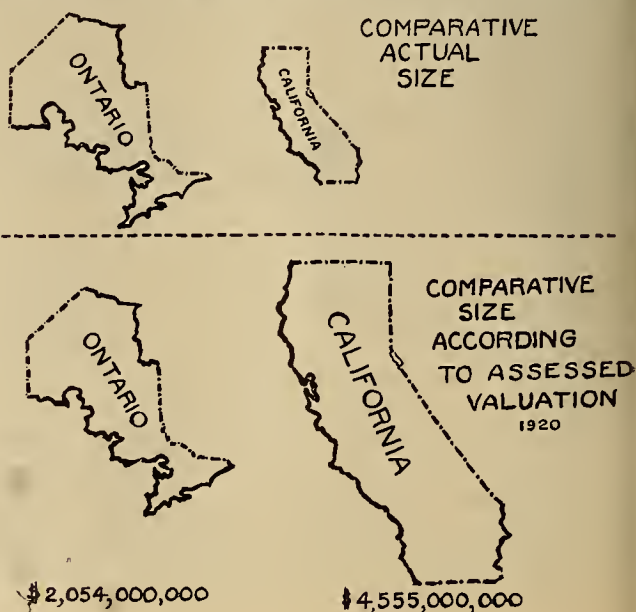
and authority of any other judiciary body in our commonwealth. Valuations given to installation and service costs must be most carefully scrutinized by citizens generally, and to this end citizens in local communities throughout the state must be encouraged to look into and constantly follow rate charges and valuations as they progress. In order to facilitate this informal checking on the part of our citizens, the data and processes by which these valuations are arrived at must be made more and more accessible to any citizen. Again, the greatest pressure must at all times be placed upon these utilities to force them to exert every effort possible to deliver electrical energy to our citizens with ever-increasing economies in production. Above all, a reasonable financial return must be assured not only to those who invest their money in these enterprises, but that great body of workers now approaching twenty-five thousand in the state of California who are engaged in operating these utilities must be given reasonable reward for initiative, service and skill they display in delivering electric power.

Another fundamental objection to government operation and ownership of any enterprise is the tendency to stifle and retard progressiveness and ambition on the part of employees, as well as breed a sense of indifference on the part of the public as to how their enterprise is being conducted. Eternal vigilance is truly the only guarantee of good government.

Let us not unwittingly place our vast development problems under a method of control under which it will be difficult for citizens to exert this guarantee of eternal vigilance—under a method that has, to say the least, proven in the Province of Ontario questionable in economic attainment after years of fair and honest trial. But rather let us place California's development under the severest type of public regulation with full play of initiative given to those who engage in this work, and yet with the one sound and sane safeguard of her progress ever ready to be brought to bear, namely, the "eternal vigilance" of an intelligent and well-informed public.



BUILDING PERMITS—15 PRINCIPAL CITIES IN CALIFORNIA AND ONTARIO



Importance of Oil as Fuel for Railroads on the Pacific Coast

In View of its Ability to Increase the Steaming Radius of Locomotives, Railroads Will Have First Call on Oil Fuel Over Any Other Land-fired Use if Conservative Steps Should Ever Be Required

By J. C. MARTIN, JR.

Extracts from a paper read before the San Francisco Section of the American Society of Mechanical Engineers.

NO means of developing the vast resources of the Pacific Coast are possible without railroads, because without transportation to this part of the United States, the rich dormant resources could not be developed, as civilization could not be put in touch with them or the products moved to paying markets after development.

We have come to learn that the condition or health of the railroads is the true barometer of the conditions existing in the territory through which they operate. In fact, this great western country could not or would not have been developed without the modern steam railroad.

Inasmuch as fuel represents the second greatest item of the operating cost of a railroad, its importance cannot be underestimated. In discussing the potential fuel supply of this district, and in order to have a clear understanding of the amount of steam fuel annually used by the Pacific Coast Railroads, it is first necessary to know to a reasonable degree of certainty the quantity that must be provided and how its transportation can most expeditiously be arranged for to meet the demands of service. We have in the states of Washington, Oregon, California, Nevada and Arizona a total of 4002 locomotives, as follows:

Southern Pacific Co. (Pacific System).....	1485
Atchison, Topeka & Santa Fe Ry. Co. (Coast Divisions).....	548
Union Pacific (Oregon-Washington R.R. & Nav. Co.).....	299
Union Pacific (Los Angeles & Salt Lake Ry.).....	125
Chicago, Milwaukee & St. Paul Ry. (Pacific Divisions).....	250
Great Northern Ry. (Pacific Divisions).....	400
Northern Pacific Ry. (Pacific Divisions).....	400
Western Pacific Ry.	139
Northwestern Pacific Ry.	75
Spokane, Portland & Seattle Ry.	81
Small local railroads, lumber and logging railroads.....	200

Figuring that under normal operating conditions the modern locomotive consumes daily an average of 10 tons of coal, and that 90% of the locomotives are used daily, in order not to underestimate the amount of fuel required, we find that the total fuel consumption per year is 13,146,570 tons. Considering the average B.t.u. content of the coal used as 12,500 per pound and that 4 barrels of fuel oil (42 gallons per barrel) of 18,500 B.t.u.'s per pound is equal to one ton of this coal, we have an equivalent of 52,586,280 barrels of fuel oil required annually.

With this information in hand and considering that any hydroelectric development which would affect steam railroads by putting into use electrical units on certain divisions instead of steam operated locomotive units would, in the development of our Pacific Coast section during the next twenty years, call for further steam locomotives, to the extent that the total number of locomotive steam units will be substantially the same as today, it is then necessary to determine where the segregation of fuel oil and

coal can best be made to serve the respective states herein enumerated from an economic point as well as a conservation of supply for the next twenty years.

Of first consequence is the matter of securing an adequate supply to meet the demands of service, for obviously without fuel operation ceases, and secondly, to lay down the most economical fuel to use in that particular state or territory in which the locomotives are operating, the kind of fuel used being governed very greatly by the transportation costs plus the fuel costs overlapping the equivalent B.t.u. value of the coal or fuel oil.

It is extremely difficult to assume what the future has in store in the way of railroad locomotive fuel oil, as predictions in the past have been so materially upset through the development of new oil fields of consequence even in the past two years, which today have a direct bearing on the fuel oil situation in California and the Pacific Coast. The best we can say at this time is that, in view of reliable statistical information readily obtainable on the coal supply, there is sufficient fuel oil and coal directly within or immediately adjacent to the states of Washington, Oregon, California, Nevada and Arizona for the next twenty years, if properly segregated, conserved and restricted, to the districts in which it should be economically used. For example, the state of Washington has ample coal for its own railroad use, as well as all of the railroads of Oregon; likewise, the coal fields of Utah can well take care of the railroad requirements of Nevada, and again, the coal of New Mexico can fully meet the demands of railroad requirements in Arizona, if called upon to do so through any shortage of fuel oil in California. This therefore leaves fuel oil for railroad use entirely within the state of California, should the processes now in the state of perfection, involving improved methods of cracking and refining, materially reduce the amount of fuel oil over that at present being produced to such an extent that no shipment out of California to other adjacent states could be made without detracting from her railroad requirements.

The steam railroads as developers of progress and civilization are justly entitled to one of the first calls on fuel within the area from which they can be served, and we can justly expect that in view of the great economy of oil fuel in locomotive fire boxes and its ability to increase the steaming radius of the locomotive, as it were, making available the maximum operatable locomotive power for the hauling of tonnage, that oil fuel will have precedence in railroad use over any land fired uses, should, for any reason, conservative steps ever be required on account of declining production.

Electrification of Gothard Section of Swiss Railways

One of a Pictorial Series Featuring Interesting Applications of Electric Service,
Advances in Home, Industrial and Power Construction and Noteworthy
Developments in Western Progress



Amsteg, Switzerland, showing the power works of the Gothard Railway and the viaduct of the Kerstelenbach. This station supplies power to the St. Gothard line, one of the electrified sections of the Swiss Federal Railways.



The electrified Gothard express at Goeschenen Station, Switzerland, which is the northern portal of the great Gothard tunnel. The express locomotives were built by Brown, Boveri and Company and by the Swiss Locomotive Works at Winterthur.



Retaining walls along the River Reuss, which supplies energy for the Amsteg power house. The electrification of the Swiss railroads was undertaken to reduce the cost of locomotive service and to abolish the smoke nuisance on the many tunnels. In addition the railroads are independent of coal, therefore independent of foreign countries.



New stone viaduct of the Gothard Railway near Giornico, in Italian Switzerland. This is in the region of the spiral tunnels of Travi and Pianotondo. Electrification has facilitated the maintenance and supervision of the line in the tunnels, by lightening staff work.



The electric Gothard express on the second Meinruss bridge near Wassen. This is one of the most interesting sections of the entire line. The electric traction permits much additional speed over steam on steep grades.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management, University of Washington
Educational Director, Northwest Electric Service League

THE GOODS OFFERED FOR SALE

All goods offered for sale by people can be roughly classified into two large groups, those which are bought to look at—like paintings—and those which are bought to use in some way or other. By far the majority of the things the average man ever gets to selling are of this second class. Granted this much, does it not follow that really the most important knowledge a salesman can have concerning his goods is the knowledge of the service these goods are supposed to render, and actually can render, their buyer?

The Service of the Goods

The Simmons Hardware Company has used for many years the slogan: "The Recollection of Quality Remains long after the Price has been Forgotten." With the slight correction of changing the word "Quality" to read "the Product's Service" I suggest that every salesman expecting to make a success of his profession adopt this Simmons' slogan as a foundation upon which to build his future. Suppose you sell me an electric washing machine. You can be sure that I am not going to put it in my parlor next to the flower stand, there to be admired for its beauty by my friends. You can be assured that if I have paid a good round sum of money for it I am going to use it for one purpose only—to wash clothes with.

This is so elementary that every washing machine salesman is nowadays given a more or less sketchy lesson or two in operating the machine—under store conditions. He learns in these lessons when and which lever to pull, how to swing and lock the wringer, etc. But, to come down to brass tacks, how many of you who sell washing machines can go through all the numerous preliminary, intermediary and final operations of conducting a medium-sized family wash day and come out with colors flying? Have you studied the operation of your machine—not from a purely mechanical standpoint—but from the angle of learning all the little tricks of operation under normal home conditions? Can you actually fill its tub, and then empty it, in an ordinary kitchen (not in the ideal one which exists mostly in magazine advertisements), without flooding the kitchen floor? Do you know the best amount of soap to put in—not of your demonstration soap, but of the many and various soaps preferred and used by different housewives? Can you operate your machine in a house which has no stationary tubs but only one galvanized common wash tub?

I can ask scores of similar questions about every single article you may be selling, not only about a washing machine. And, let me tell you, there are mighty few salespeople who go to the trouble of finding out these things for themselves,—but the ones who do, can always sell, even when the rest of the sales force finds it necessary to hold lamentation meetings in the packing room back of the stacks of unsold goods.

This particular point concerning your knowledge of your own goods is of such cardinal importance and is at the same time so badly neglected by the average salesman—particularly in the line of electrical home appliances—that those among the readers of this series of articles who will not shun the large amount of real hard work implied in such knowledge will find themselves more than amply repaid for their efforts.

Familiarity with Troubles

Along with this same knowledge of your goods belongs a complete familiarity on your part with all the possible troubles which may occur with the individual articles you sell—troubles in unpacking, troubles in operating—again, mainly under home conditions—and troubles in current up-keep. The buyers of your goods are not specialists, at least not in the majority of cases. And with all due respect to the manufacturers you represent, no fool-proof appliance or apparatus has as yet been invented by any man in any line. Hence, just as sure as there is a tomorrow, your customers will run into all the troubles and difficulties which can occur to your goods, and then into some nobody ever imagined possible.

People will get into these troubles even after you have properly coached them—how much more, then, will this happen if you yourself are not posted most thoroughly on these possibilities which lurk in your goods? And will you blame the customer for blaming you if he has trouble through your neglect in posting him? Also do not neglect to familiarize yourself at least with the most ordinary adjustments your appliance or apparatus may require. Nothing can kill a sale quicker than when a salesman while demonstrating some machine, is stumped by some little thing getting out of order and is forced to send for the "mechanic."

The Study of Advantages

As I mentioned above, people buy things either to use them or to derive pleasure from their possession, frequently combining both these motives. Why

then, should I buy your vacuum cleaner when the purchase of a new suit is tempting me about as strongly? Unless you make me see all the advantages of vacuum cleaning, and more particularly of doing it with your machine, the temptation held out by the suits exhibited to their best advantage in the windows of the Fit-All Tailoring Co. will make me spend those \$75.00 with them and not with you.

The price of a thing is usually held to be an indicator of its value. We say that a thing priced at \$20.00 is twice as valuable as one sold at \$10.00, and that two things marked at the same price have equal value. But this is only theoretical. If this were practically true we frequently would find ourselves in the unfortunate position of the famous donkey who starved to death between two equally tempting bundles of hay because he could not make up his mind which one to choose. In practical life the price is not a measure of value to the individual purchaser. On each article which he desires he places a peculiar sort of personal valuation which depends entirely upon the degree in which this article appeals to him, and the strength of the buyer's desire is a measure of this personal valuation. If you can reinforce the originally present desire of your prospective buyer, your \$75.00 vacuum cleaner will look to him dirt cheap in comparison with the \$75.00 suit of the tailor and with the \$50.00 vacuum cleaner of your competitor. But you cannot so intensify your customer's personal valuation of your goods unless you not only know all the advantages offered to its user by your machine but also can place them before your customer in the most convincing and tempting light.

And here I must remind you of what I said before about enthusiasm: before you can sell successfully you must be sold entirely on your goods yourself.

Learn Specific Advantages

Efficiency is a modern word, and it has been much abused. Nevertheless, it is the efficiency of your product which you want to study first of all.

Does your appliance save time? Of course, it does, but how much time does it actually save? An ordinary family wash for a small family of two adults and two children, one of nine and one of four years, takes about four hours on the weekly wash day. I have heard many salesmen state that with their washing machine it will take but one hour. Carefully conducted observations have taught me that the most efficient machine will cut down the four hours to two and one-half if expertly used. Have you made comparative tests with your machine, or are you talking theory to your prospects?

When selling your vacuum cleaner to a hotel can you tell its manager how the cleaner will increase the "production" of the floor employes? How many more rooms can a girl clean on the average with a vacuum cleaner than without one?

An electrical range notoriously bakes things more uniformly than either a coal or a gas range. Have you studied this point theoretically only or

have you convinced yourself in a practical way of this advantage, and how?

Is the thing you sell a protector of health? Does it eliminate danger to small children?

The salesman of a patented stand for electric flatirons whom I knew was trying to sell it as the "happy home for your flatiron," although I could see that its main advantage was in gripping the iron so it could not be pulled off the board to which the stand was fixed. All that this man had to do was to study the practical advantages of his own product which would appeal to the protective instinct of the mothers instead of appealing to their desire to keep their irons unscratched. Incidentally, my friend is now trying to sell something else because he could not "make the stand go."

I said a moment ago that people buy things for pleasure. Have you studied what pleasures your article can give to people? How many of you who sell washing machines can describe to your customer the beauty of linen finished with the aid of your machine? How many of you can talk about the perfect taste of your client's pet dish when cooked on your electrical range? Have you tasted dishes prepared on your range? It does take a poet to describe in tempting language that which he has never seen or felt, but the man who has seen and has felt can transmit his enthusiasm acquired by such intimate knowledge a hundred times better than the poet, because he can put into his description that sincerity which the imagination of a fiction writer always lacks.

Financial Advantages

Next to an appeal to their desire for health and bodily comfort, people are more strongly impressed by possibilities of financial advantage than any other sales argument. How much money will I save in laundry bills or laundresses' "fees" and car-fares if we buy your washing machine? Do not tell me I shall save all of it, because I know just as well as you that I will not. I shall have to spend money for soap, for current, and for repairs once in a while. Study out this problem in detail so as to be ready to give me convincing data, and not generalities or improbabilities.

If I come into your store and look at your electrical range can you discuss with me intelligently my possible current bill? How much current will I use per month with a table toaster? How much money will I save by using an electrical glue-pot as against my present gas heated pot? Remember all the time two things in this connection: first, current is not the only cost of operating electrical apparatus; and, second, I—your buyer—am a layman and you should not try to talk kilowatts to me if you expect me to understand you in dollars and cents.

And most of all, remember that you will not engage the services of a doctor in whose knowledge you do not have absolute faith, and that I, your buyer, will not accept your services unless I have a similar faith in your knowledge of the goods you sell.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Study of Internal Organization of Factories Suggested

An important fact brought out at the recent unemployment conference in Washington was the lack of statistical information concerning operating data of individual firms. Unemployment is not confined to those who are thrown off payrolls in times of cyclical and seasonal depressions and otherwise. Absenteeism represents another important kind of unemployment. However even if there are no depressions, no discharges and no absenteeism, even if every employe were at his place of work every minute of every work day throughout the year, there will still be found a very considerable amount of unemployment of these employes during working hours. Sections of workers run out of work because of the failure of work to come through the preceding operation rapidly enough or because of the lack of some necessary materials; they are held idle while waiting for instructions, by the breakdown or maladjustment of machines, by the power going off, and so on.

All this idleness represents waste of productive capacity, waste of overhead expense, whether the affected laborers are piece-workers or time-workers. If they are piece-workers, their earnings are obviously affected. If they are time-workers their wages during such idleness represents additional money

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

loss to the employers.

How great all these losses are no one appreciates until he sets out to record and measure them. When this is done, most employers will be astonished at their aggregate extent. When the employer comes to know how frequent and how great such losses are, he will turn his attention to devising means of eliminating them.

To assist a business establishment in the collection and summarization of operating data for its own guidance, a model questionnaire was designed to enable the executives to gage the effectiveness of the planning and administration of industrial work and to stimulate the study of means of improvement.

Simple Cutout Prevents Injury to Underground Transformers

One of the worst enemies to continuity of service in underground systems for light and power is the flooding of transformer vaults or manholes with water. This is equally true in industrial plants and city service. A new and novel way of ascertaining or announcing the presence of water in such vaults or manholes before it reaches a dangerous height in localities that are frequently flooded by storm or back water, and which usually ends disastrously to transformers and apparatus located in them if not checked and pumped out, is being used by the underground department of the Los Angeles Gas and Electric Corporation.

They place a single-pole, primary fuse block about six inches above the floor of the vault with one side of the primary circuit which is feeding the equipment in the vault, connected to this cutout, so that water will cause the lines to indicate ground when the level of the water reaches the cutout. Through the station attendants and the trouble department the ground is located and the vault is pumped dry before any damage to transformers or apparatus occurs. The simplicity of the arrangement, low cost of installation, and the fact that it has broad possibilities in other cities and industrial plants, make this wrinkle interesting.

Illumination Is Essential For Economical Production

Economy in production is most essential at all times if business is to prosper. Just now the question is of supreme importance in view of the necessity for lowering costs in every department. A mere curtailment of certain expenses does not necessarily mean a reduction in cost. As an extreme case one might eliminate heat in the winter and save coal consumption. The result is self-evident. The numbed fingers could not function quickly and the workers would lose a great amount of time in trying to keep warm.

Lighting might be cut down and the power bill reduced, but we would have a parallel case. Under the low intensity every movement would be slowed down and the cost per unit of output would mount at a surprising rate. It has been pointed out that high level illumination without doubt makes it possible for each operator to turn out more work per day and is therefore an especially essential element to efficient shop management. No matter how efficient the machinery or how well trained the workers may be, if the efforts of the two cannot be coordinated then production will be slowed down.



ELECTRIC TRUCK DOES WORK OF 25 MEN

This electric truck has been in operation in one of the largest tire factories in the country for more than six years and has been driven 180,000 miles hauling 200,000 pounds of material every eight hours, doing the work formerly requiring 25 men. Two large storage batteries supply the energy to drive the truck. They are replaced every eight hours. Trucks of this type are highly economical for intra-factory haulage.

Northwest Firm Solves Problem of Transmission

Belt Slippage and Friction Losses Overcome by Tacoma Company
With Laminated and Compressed Spruce Products

HIGHLY efficient mechanical power transmission machinery is essential for economic production in any industrial plant. Belt slippage, frictional losses and methods of eliminating excessive upkeep costs are constantly being studied with a view of increasing efficiency or decreasing monetary costs for upkeep and replacement.

Recently the attention of western engineers and industrial heads has turned

practically one-half of its original thickness.

"Compressed spruce" is approximately five times stronger than the wood in its natural state and in this respect resembles vulcanized fibre and metals.

In the manufacture of "compressed spruce" pulleys no bolts, flanges or any metal is used except the cast-iron hub. This hub is forced into the pulley under

mechanical Engineering Laboratory of the university are as follows:

HORSEPOWER CAPACITY PER 1-IN. WIDTH OF BELT

Type of Pulley	1%	1½%	2%	Comparative Transmitting Capacity at 2% Slip
Cast Iron	0.58	0.69	0.74	100.0
Steel	0.71	0.78	0.81	109.4
Wood Split	0.63	0.77	0.82	110.8
Paper	0.62	0.76	0.83	112.1
Compressed Spruce	0.76	0.81	0.84	113.5

Belt tension200 lb. per sq. in.
Belt speed2,000 ft. per minute

COMPARATIVE WEIGHTS OF VARIOUS TYPES OF PULLEYS

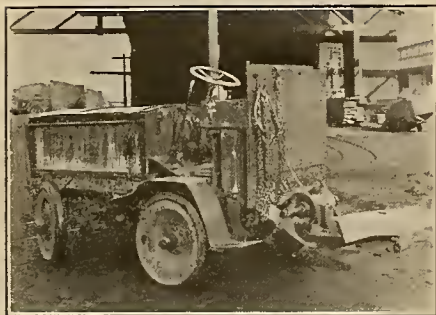
18-in Diameter — 6-in. Face

Cast Iron	65.0 lb.
Steel	40.0 lb.
Split Wood	21.5 lb.
Paper	41.5 lb.
Compressed Spruce	22.0 lb.

Another quality common to pulleys built as is the "compressed spruce" pulley, is their perfect balance, which is not always possible in devices rough cast in metal. Owing to this fact as well as to its lack of tendency to fly apart, safe speeds may be considerably higher than allowable with heavy metal castings.

Numerous belt driven motors, edgers, band and circular mills, planing and other heavy duty machines are equipped with "compressed spruce" pulleys throughout the Pacific Coast and are paying big returns by decreased belt slippage, more production, elimination of bearing troubles and longer life to belts.

Friction fillers of "compressed spruce" are in successful use in scores of mills and other industrial plants in place of the old style expensive paper type. These friction fillers are made up like a cartridge all machined ready to slip on the cast-iron sleeve, thereby saving time, labor and loss of production when a friction needs to be changed.



A large electric lumber tractor which has been equipped with compressed spruce rear wheels. The severe service to which this truck was subjected rapidly destroyed ordinary spoke wheels. The present wheels have been in service over a year with remarkable success. The truck is one of many used by the St. Paul and Tacoma Lumber Company.

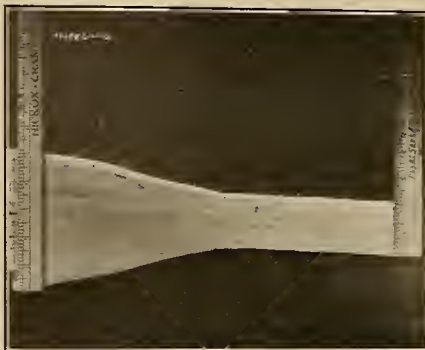
to the utilization of the vast spruce resources of the Pacific Northwest by means of a new process for the manufacture of mechanical power transmission machinery which promises to eliminate many of the present difficulties and losses.

During the late war when the lumber industry of the Northwest was busily engaged in getting out spruce for airplane manufacture there was worked out a new wood of special density and possessing great frictional properties. This new product is "compressed spruce" and was invented by two Northwest engineers, R. L. Watts and E. J. Walsh, of Tacoma, Washington.

While the factory output has been mostly pulleys, friction fillers and conveyor rolls, automobile and truck wheels have been made of this material. Actual operation of "compressed spruce" automobile wheels on the heaviest duty equipment has proven eminently satisfactory, due to the great mechanical strength and resiliency. These wheels will stand the greatest of shock loads and temperature or weather conditions have no effect on them.

The manufacturing process is decidedly simple. The spruce laminae are laid so that the grain of each layer is at right angles to the grain of the preceding and succeeding layers.

The spruce veneer or lumber is passed through an automatic glue spreading machine where waterproof glue is applied. The dimensions of the blocks of laminated wood are made to suit the order requirements. After the block, or stock, has been made up it is placed in a powerful hydraulic press and subjected to a pressure of approximately 200,000 pounds per square foot, which reduces the wood combination to

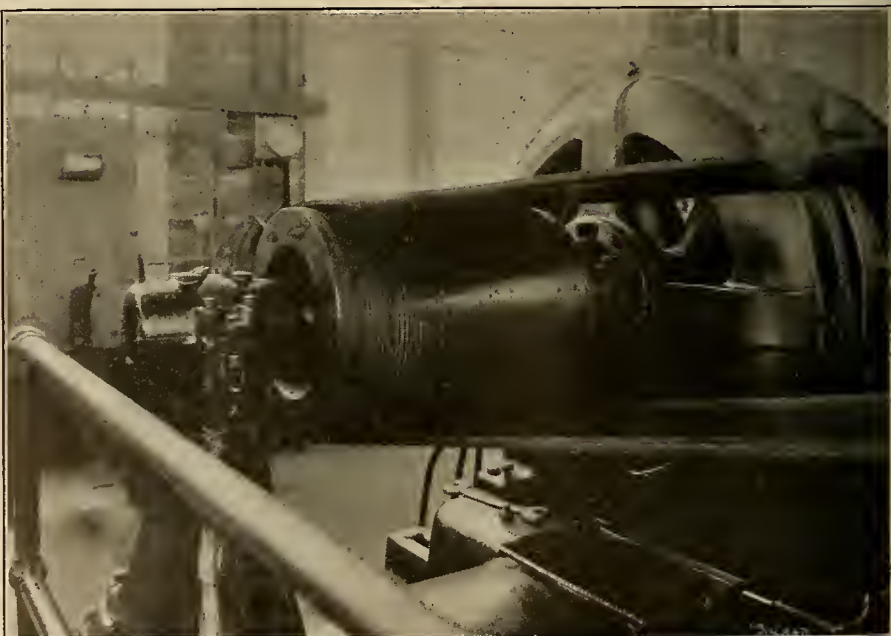


Section of a block of compressed spruce one end of which has been subjected to a pressure of 200,000 lb. per sq. ft. while the other is in its natural state.

heavy hydraulic pressure and in no instance has there ever been a hub come loose.

After being machined the product is given a waterproofing treatment which renders it absolutely impervious to moisture.

A very desirable quality which "compressed spruce" possesses is its high coefficient of friction. Tests conducted at the University of Washington, over a long period of time, have shown its superior qualities in this regard. Figures which are vouched for by the Me-



A compressed spruce pulley on a 500-hp. motor which furnishes motive power to a large air compressor at the Tacoma smelter of the American Smelting and Refining Company. No belt tightener is required owing to the high coefficient of friction of this type of pulley.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Your Show Window—a 24-hour Silent Salesman

A Discussion of One of the Most Important Weapons Which the Electrical Contractor-Dealer Possesses

By C. A. POPE

Advertising Manager, Hendrie & Bolthoff Mfg. & Supply Co., Denver

Your best salesman is your show window. It works twenty-four hours every day in the year and makes an inviting appeal to all who pass your store. That is, if you are using the space for the purpose it was designed.

But, is your show window working? Does it appeal to the public? Is it even a salesman, or is it just an out-of-the-way place where you pile up your wares?

The value of a show window is no longer a matter of theory or guesswork, but is a quantity that is governed by the law of optics—by the law of vision. Your window display appeals to but one of the five senses—seeing. Therefore it must attract, interest and please the eye and through it awaken a positive impulse in the mind of your prospective customer if you hope to create a favorable impression—if you hope to make of him a buyer.

Display means the proper arrangement of articles in the window plus getting them before the eye of the public. Getting a display before the public calls for light. The light of day is at your service from eight to ten hours out of every twenty-four, during which time your trim stands out before the public—and then what? Is your window an idler the other fourteen or sixteen hours? Does darkness prevail where light would add sales?

If that is the case, electricity—window display lighting—is your solution.

Now, be honest with yourself. Just for tonight take a little walk and notice the different stores and see for yourself where the crowd is “window shopping,”

see what stores are attracting most attention. Then step back across the street and size up your own show window.

Do people stop at your window? Do you get your part of the “window shopping” trade? Certainly you know that a great majority of people “window shop” before they actually buy! They pick out the articles on display that appeal to them and then go back to the store where they were displayed and buy. Your show window is to the passing public what your counter or shelf display is to the buyer who comes into your store, yet it is even more, for the show window brings new customers into the store who never before knew of you or your goods.

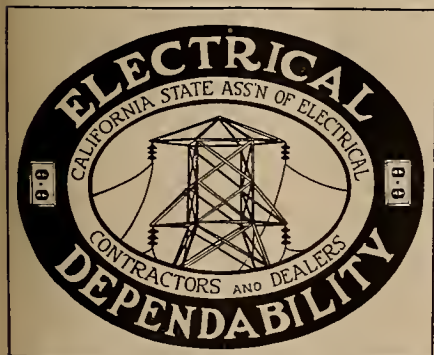
Even though people may not be interested in your display, they can not help being attracted by the light and drawn to the bright progressive window, nor can an interesting trim get their attention if the effect is dull and depressing, or if the light is harsh and glaring. The public—your prospective customers not only demand that you keep your windows lit up, but that you use a pleasing effective lighting system that will attract rather than repel.

After all much of the trade comes from the store's show window, and as it is from the trade that your profits are derived, is it not wise to use your best advertising medium, to light up your show window and make it work at high pressure for the full twenty-four hours?

California Contractor-Dealers Adopt New Emblem

The California Association of Electrical Contractors and Dealers has chosen the emblem which will be used to represent the organization on stationery, window cards, membership cards and billboard displays. The emblem is oval in shape and bears the words “electrical dependability,” with a duplex convenience outlet on each side. The center of the oval contains the association's name together with a high tension steel transmission tower. The colors will be dark blue and gold.

The emblem has been adopted with a view of its wide application for billboard work. It has been suggested that on billboards, instead of the steel tower, the center of the emblem should portray a hydroelectric development scene in color.



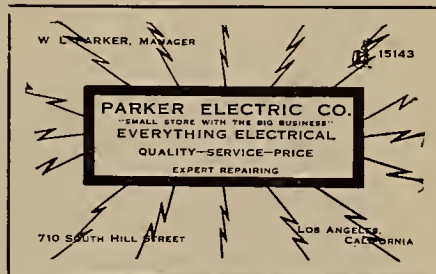
This is the emblem which has been adopted by the California Association of Electrical Contractors and Dealers to represent their organization. The background will be dark blue with the lettering in gold.

The Electragist's Business Card as a Message Bearer

As long as a dealer in electrical goods goes to the expense of buying business cards it is to his interest to put something on them that will not only catch the attention but will cause people to think of his line and name.

The Parker Electric Company, 710 South Hill Street, Los Angeles, uses a blue card with blue and red printing on it. The business message of the card is in the dark blue and there is a design in red that suggests electricity.

Instead of a business card, a salesman in Schluter's, Oakland, frequently gives out a booklet describing the washer, the sweeper or other electrical



The Parker Electric Company, Los Angeles, uses the above business card with the various company representatives' names upon it. The card is printed in dark blue on light blue stock with the design suggestive of electricity printed in red.

device he has been talking about—this to people who do not “sign on the dotted line,” of course.

He opens the booklet at the illustration of the type or style of machine that seems to interest the party the most. Then he does something that beats the ordinary business card, and what is more, is almost 100-per-cent insurance that the party will carry the booklet home to husband for a talk-over:

He notes the price of the device on the page in pencil, then a remark or two about it, his own name and that of the firm. Thus the party is tempted to keep the booklet open and refer to that particular machine. It means more than merely handing out a book, this personal addition does.

Another card that is kept is that used in another city in which there are many office buildings. When a person wishes to locate some professional man or shop that lists the office building instead of the street number this electrical store's business card comes in handy. It is double-size and folded endwise. Opened up, it presents a long list of the local office buildings, alphabetically arranged.



Eighteen per cent of the people of Boulder, Colorado, visited this electrical home during the ten days it was on display. The home was built by F. S. Henderson, manager of the Western Light and

Power Company, and the exhibition was arranged through the cooperation of the various members of the electrical industry in the city.



The kitchen equipment in the Boulder electrical home was most complete, even including an electric pressure cooker and a motor operated ice cream freezer.



The Boulder home was primarily designed for comfort as the above view of the living room shows. One of the features of its exhibition was the enlisting of the aid of the local Woman's Club to act as hostesses.

Electrical Home at Boulder, Colorado, Establishes Attendance Record

Eighteen Per Cent of City's Population Visits Modern Bungalow Constructed and Displayed by Central Station Manager

ANOTHER record has been established in the electrical home movement in the showing of an electric bungalow at Boulder, Colo., to 18 per cent of the population of that city. Although the home was only open ten days, even with a spell of bad weather, 2629 visitors were registered and the advertising cost to secure this attendance was about \$350.

To F. S. Henderson, manager of the Western Light and Power Company at Boulder, the credit is due for putting over the project for it was his home that he offered to the electrical interests of the community to tell the story of "The Modern Home" for the first time in Colorado.

Mr. Henderson designed and built the home himself. He put some of his own furnishings and equipment in it during the display. As the central station manager in that city, he invited the contractor-dealers to cooperate in the wiring, furnishing and display of the home. The literature distributed during the exhibition referred to all individuals and concerns, including the furniture house and musical dealer, as making the exhibition possible.

Because of this unselfish spirit and lack of exclusive commercialism, all who participated are unanimous in the belief that untold advertising value was secured which will return dollars and cents in their respective lines of business.

The home was opened for display March 3rd and closed March 12th. With the exception of two Sunday nights, it was open for inspection daily from 1:00 p.m. to 10:00 p.m. The largest one-day crowd was 524 and the last Sunday afternoon 304 people entered the house. A severe snow and windstorm for two days did not deter 250 people from braving the elements to see the house. Considering the population of Boulder as 15,000, the total attendance of 2629 approximated visitation on the part of 18 per cent of the population.

Newspaper advertising was used during the week preceding as well as the week of the exhibition. Three thousand hand addressed personal invitations were sent out by Mr. Henderson. Stickers were furnished all the interests cooperating in the display for use on statements, letterheads and other communications. The central station on its monthly bills extended an invitation to all its customers to visit the home. The local newspapers were found to be extremely generous in their use of news items and other features.

According to Mr. Henderson, the most valuable publicity secured was that resulting from the cooperation of the Boulder Woman's Club which provided two of its members daily to serve as hostesses. Although they were not in a position to explain the features found in the home they gave a personal touch to the showing and helped out in meeting the people at the door and making them feel at home. Mrs. Henderson, wife of the owner, was present at all times and she conducted many parties on a tour of the house.

The Electrical Cooperative League of Denver gave as much assistance to the project as was possible, first in helping Mr. Henderson line up the other interests in Boulder and last by sending a special delegation of Denver electrical men to Boulder to see the home. Some of the League members furnished the fixtures and other appliances displayed in the home.

The success of the Boulder home is indicative of the benefits which will accrue in other parts of Colorado through the electrical home movement. With many of the state newspapers showing an interest, it is believed that following the exhibition in Denver additional homes will be featured during 1922 in at least five other Colorado cities.

Opportunity, Experience and Appliance Campaigns

An Outline of an Ideal Electric Appliance Campaign Based Upon the Experience of Contractor-Dealers in the Northwest

By R. G. EMERSON
Field Representative, Northwest Electrical Service League

Let no electrical dealer construe these few notations as an attempt on the part of the writer to formulate rules and regulations for conducting a successful appliance campaign, for in the first place I know that no one would be able to draft such a code and in the second place no one would pay much attention to it if it were written and published. Yet we are all interested in the above mentioned subject and an exchange of ideas should prove of value to those dealers who are seeking to take full advantage of present day opportunities.

The following memoranda, written with an appreciation of this truth, are some of the suggestions given by various contractors in the Pacific Northwest and are based upon experience. If these dealers could be combined for the moment in one personality, whom we might call "Aleck Tricoll," the field representative of the Service League upon questioning Aleck regarding the best way to conduct a successful appliance campaign would probably receive an answer something like the following:

"I have always found that when I want to sell something I have to study the problem of how to do it in about the same manner that a successful manufacturer prepares to sell his products. First of all I lay my general plan out on the table and analyze it. After that it isn't so hard to decide upon an economical and efficient program for accomplishing this.

"In this case I know right away just what I have to sell and to whom I must appeal in order to sell the stock. Electrical appliances, including everything from a hand iron to an electric range, must be sold to home owners and renters—to householders, and more particularly, to housewives. The real problem is to determine how I'll go about making the sales.

"The general plan for doing this divides itself into two parts, the first of which is more or less preparatory and the second is productive. By advertising I must interest the greatest possible number of the prospective customers in 'domestic electrical servants,' and by a sales campaign which is closely tied to the advertising program I must exchange the goods on my shelves for their money.

"Advertising is a great force in the merchandising world—everybody says so, including the newspaper solicitors—but like another dynamic force, electricity, it isn't entirely understood and it requires very careful handling. So in planning my advertising campaign I stick pretty closely to a few proven methods, relying upon three general methods—newspaper advertising, direct, or mail advertising, and my store windows.

"In using the mails to advertise my campaign I appreciate the importance of the 'prospects' list I have built up during the past year. The advantage of this direct advertising over the newspaper method is that if my message is properly presented I am more sure of

the prospect's attention. I use the two ways of advertising together, however, and make sure that they tie in with the sales campaign.

"Getting closer to home, though, my windows offer me a real opportunity to show the passers-by the actual appliances in operation. By putting action into the window display I can make them step right out onto the sidewalk and say 'Come in and look at me.' I'll trim my windows neatly and put a lady demonstrator in there who will show all who pause how they can 'do it electrically' in the home, with efficiency, economy and comfort.

"But after the advertising is all planned I'm ready to get down to the serious business of determining just how I'm going to sell the appliances. First of all I'll have the store neat and attractive, for what might ordinarily look all right to an old 'knob and tuber' like me might not appeal in the same way to the prospective customers, particularly the women. The stock will be arranged neatly and without the usual suggestion of being overcrowded. The illumination will be arranged to please the visitors and throw a favorable light upon the appliances.

"Then there must be chairs to make everyone comfortable while they watch the demonstrators or listen to the lectures. The demonstrators will be women, because when the women visitors see that other women operate the appliances without danger or fuss they forget most of their unexpressed fear of things mechanical. I'm thinking mainly in terms of women prospects, but if men come in and are interested in the appliances there's no particular harm in having the demonstrators of the fair sex.

"There are many other matters to be considered in planning for the sales that

will be made in the store but they will be taken care of out of my experience. The next matter with which I'm concerned is the program for the 'up town' canvass. I'll have several good salesmen calling on vacuum cleaner prospects, and at the same time they'll create considerable interest in the other appliances. Some of the people who read the advertisements will come to the store, but many others who are only mildly interested will not, and this latter group I must reach by going to them. That's the reason for having a canvassing campaign at the same time as the store demonstrations.

"All this constitutes my general plan of action, using my own experience and the suggestions of others as the foundation. I'll not forget, however, to call upon my good friends for additional information and aid, and the three best friends I know of are the manufacturer, the jobber and the trade journal.

"From the manufacturer I can obtain cuts and copy for my newspaper ads and circulars and for my mail campaign. The jobber will probably loan me a range or mangle demonstrator for the store, and I have found that his salesmen often have helpful ideas they have picked up on the road. The trade journals are always ready to help and I keep in close touch with the merchandising suggestions they have to offer.

"Yes, that's about all I have to offer on the subject. There are many special plans which have helped others and I'll try to use those which I can see will aid me, but with this general program of advertising and sales effort, and a call upon my friends for assistance, I think I can put on a quick-action, economical campaign and sell more appliances than I've been able to do before."

After obtaining the above interview your correspondent has little or nothing to add. The electrical dealer who plans a comprehensive program based upon his own experience and the experience of others, and who puts plenty of sales force into the execution, is probably he who conducts a successful campaign.



SELLING THE ELECTRICAL IDEA AT THE MERCHANT'S FAIR

The Porterville Electric Company at Porterville, California, aided sales appreciably during the last month as the result of a comprehensive booth which the company maintained at a merchant's fair held in that city recently. W. C. Little and F. A. Rounsaville are the proprietors of this enterprising store. The above picture is a two-minute time exposure lighted by two 1000-watt daylight lamps.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Commission Grants Licenses

Federal Power Body Acts Favorably on Permit for San Joaquin Company. Approves Other Applications

License to develop a comprehensive power project on the north and west forks of the Kings River in Fresno county, California, has been granted to the San Joaquin Light and Power Corporation by the Federal Power Commission. The project contemplates the construction of seven plants having a total ultimate capacity of 266,000 horsepower. Estimated cost is \$51,000,000.

In granting the permit, the commission stated that it believed that the total amount of power generated would be needed in the San Joaquin valley by 1930. Under the plans of the power company, work on the first plant will begin within the next ninety days and the final plant will be completed not later than 1927. The project contemplates the storage of 204,000 acre-ft. of water but a permit for this cannot be issued until the relative rights of the water users along the stream have been determined by the state.

The commission at the same meeting approved the assignment by the Western States Gas and Electric Company of Stockton, California, of parts of the rights granted to it under a previous license to the El Dorado Power Company, one of its subsidiaries.

Applications for preliminary permits were approved by the commission for the Wrangell Pulp and Paper Company of Wrangell, Alaska, the Alaska Public Utilities, Cordova, Alaska, J. H. Hughes of San Francisco and the Big Horn Irrigation and Power Company of Hardin, Montana.

The Wrangell company contemplates the development of 12,000 horsepower on Grant and Harding creeks, tributaries of the Bradfield Canal. The Alaska Utilities would develop 500 to 1000 horsepower on Power Creek near Cordova.

J. H. Hughes of San Francisco proposes to develop approximately 4000 horsepower on French Creek, a tributary of the north fork of the Feather River, for the purpose of supplying power to a contemplated electro-chemical plant.

Must Transfer Records of 120,000 Consumers in Los Angeles

The task of transferring the records of 120,000 consumers as well as other data from the books of the Southern California Edison Company to those of the bureau of power and light of the city of Los Angeles in connection with the sale of the central station company's transmission lines to the city,

has been undertaken by a corps of accountants. The records must be transferred before the actual transfer of the properties can be effected.

In transferring the name, address, kind of business, kind of service and meter readings from one set of ledgers to another, it is estimated that at least thirty days will be required, as the work cannot progress faster than 4000 a day.

The work includes engineering as well as clerical data. The city of Los Angeles recently paid the Southern California Edison Company \$11,000,000 for its transmission lines inside the city limits, at the same time agreeing that it would not enter into competition with the central station outside this district.

Pacific Gas & Electric Company Buys S. F. Property

The Pacific Gas and Electric Company has purchased a large block of property at the corner of Market and Beale streets in San Francisco upon which it is planning to erect a general office building. It is understood that the entire investment, including property and building, will approximate \$1,750,000.

The building will adjoin that which is being constructed by the Matson Navigation Company at the present time, and these two structures are considered the advance move in a concerted action for the development of lower Market street. Concerning the purchase, Wigginton E. Creed, president of the company, has said:

"The exceedingly rapid growth of the company's business has made it essential that it secure larger quarters for its general offices. At the present time the company owns and occupies a six-story building and an eight-story building immediately adjoining, on Sutter street, between Powell and Stockton streets. Also, quarters outside these buildings are occupied by portions of the engineering and operating staffs in the Grant building, the Cluett building and the loft building at 557 Sutter street.

"The company will erect a general office building on the new property at Market and Beale streets and will retain the eight-story building on Sutter street as the San Francisco division office for the convenience of city customers.

"The site at Market and Beale streets was selected because it affords easy access to all the customers and stockholders of the company in central and northern California. It is but little more than three blocks from the ferry terminal and faces the intersection of four of the city's business thoroughfares.

"This site also presents an opportunity for designing and erecting a building which will be a credit to the city and will assure the utmost of convenience in the company's operations.

"Detailed plans as to the development of this property will be announced later."

The Commission of Public Docks of Portland will begin construction immediately of a new 500-ft. pier on the old site of the Willamette Iron Works at the foot of Seventeenth Street. This move has been made necessary by the rapidly increasing business of the port.

Utah Copper Mines Reopen

Bingham Properties Placed on Partial Production Scale. Payroll to be \$500,000 Monthly in 90 Days

Operations at the mines of the Utah Copper Company at Bingham, Utah, were started April 4th, with the employment of additional men, with a view of mining from 2000 to 3000 tons of ore daily for shipment to the mills of the Arthur plant at Garfield. Milling operations have also started at the Arthur plant.

On the above date 550 men were on the payrolls of the Utah Copper Company. They are divided as follows: 170 men at the mines; 80 on the Bingham and Garfield Railroad, and 300 at the plants. Three shovels are at work at the mines, one making a grade change on level F and the other two loading ore.

It is estimated by officials of the company that within ninety days the payroll will amount to \$500,000 a month.

It is stated by officials of the company that production at first will be on a small scale and that it will be gradually increased.

\$2,000,000 Timber Tract Changes Hands in Washington

What is claimed to be the largest timber deal in the history of the Grays Harbor district in Washington was consummated recently when William E. Boeing and associates of Seattle sold 600,000,000 feet of timber to the Miller Lumber and Logging Company of Everett for a consideration in excess of \$2,000,000. The timber tract is at the head of the Hoquiam River, and is mostly fir.

The tract was purchased for immediate logging and surveys have already been completed for eight miles of railroad which will connect the tract with Hoquiam. The timber will be logged at the rate of 50,000,000 feet annually.

To save from a total loss the four million dollars invested in the potash industry in Utah, a protective tariff on all shipments of this mineral from foreign countries must be enacted at once, according to a statement recently made before the Salt Lake City Chamber of Commerce by J. L. Silsbee, president of the Bonneville Development Company of Bonneville, Utah. A maximum tariff of 2 cents per pound over a period of five years would enable the domestic potash industry to develop to a point where it would be enabled to compete with the foreign producers, Mr. Silsbee stated.

California-Oregon R. R. Seeks to Discontinue Service

Because an area of 10,000 square miles with a population of 10,000 would be entirely without rail transportation, the State Railroad Commission recommended to the Interstate Commerce Commission in a report forwarded recently that the application of the Nevada-California-Oregon Railway Co. to suspend service be denied. Hearing on the application was conducted by the California Commission February 15 and 16 in Alturas for the Interstate Commerce Commission. The road operates from Hackstaff, California, to Lakeview, Oregon, through Lassen and Modoc counties, California, and Lake county, Oregon. The part of the line extending south to Reno, Nevada, and branch lines were sold to the Western Pacific in 1917. The road at present consists of 171.29 miles of main line. In 1921 the company operated at a deficit of \$52,000.

The Commission, after an investigation by its engineering department, reported that a saving of \$31,000 was possible by changing the operating schedule from a daily to a tri-weekly service, by the discontinuance of the salary of \$10,000 a year of the president and by closing the New York office.

After reviewing traffic possibilities in the territory, the Commission declared that while these had future possibilities, the immediate problem was to obtain more revenue for the road on the basis of present business. A fair solution of the company's financial problem is held out.

Seattle Lets Contract for Cedar River Water Supply Project

Grant Smith and Company of Seattle has been awarded the contract for the construction of the Cedar River pipe line No. 3 from Molasses Creek to the Volunteer Park Reservoir by the city of Seattle Board of Public Works on a bid of \$1,468,602.50. The pipe line will be 14 miles long and will be constructed of 60-in. riveted steel pipe.

Thirty bids were submitted for the work by eleven different firms under the various alternative proposals. Both Grant Smith and Company and the Puget Sound Bridge and Dredging Company submitted bids for the complete installation while D. A. Foley and Company, Jahn and Bressi and Grant Smith and Company offered to excavate the course and install the line without furnishing the materials. Six companies submitted proposals for furnishing the materials alone. They were the Puget Sound Machinery Depot, the Biggs Boiler Works Company, the Western Pipe and Steel Company of California, the Willamette Iron and Steel Works, the Seattle Boiler Works and the United States Steel Products Company. The Continental Pipe and Manufacturing Company submitted three bids on various types of wood pipe.

Seattle at the present time has under way one of the largest programs of public work of any city in the country. The program includes the Cedar River water supply project, the Skagit River power project and a street paving and improvement program in excess of two million dollars.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by Paul Wooton, Special Correspondent of the Journal of Electricity and Western Industry

After having listened to a mass of testimony pertaining to the utilization of the waters of the Colorado River, the Secretary of Commerce has returned to Washington more convinced than ever that an equitable distribution of the benefits which may accrue from this resource can be made between the states in the Colorado River basin. On his return Secretary Hoover declared that all indications in the West point to an improved business situation. The only exceptions, he said, are Utah and Idaho, and even there he expects to see a gradual return to more prosperous times as metal mining gathers momentum.

Road Appropriations

The committee on roads of the House of Representatives reported out its bill on April 6 authorizing the expenditure of \$65,000,000 for the Federal Government's proportion of highway construction during the next fiscal year. For the following fiscal year \$75,000,000 was authorized. No provision was made for a third year, as was being urged by the states, because the committee believes the business situation will improve so that appropriations for that year may be at the rate of \$100,000,000. The committee authorized an appropriation of \$6,500,000 for forest roads and trails during the next fiscal year, but made no provision for the year following.

The action of the committee in fixing \$12,500 as the maximum amount per mile which the government will contribute to any road meets with some objection from the western states, where it is believed a considerable hardship will be worked on those sections where the mountainous character of the country makes road building very expensive. This type of construction almost invariably is in sparsely settled localities, where the local interests are in no position to bear an extra amount of the expense. The new bill will allow underpass as well as overhead construction in the elimination of railroad crossings at grade. For the first time a penalty clause has been written into the bill providing severe punishment for any illegal use of federal aid funds.

Coal Strike

As the coal strike enters its second week, the mine workers have outpointed the operators in bids for public support. This has been due largely to the publicity growing out of the hearing before the committee on labor, of which Representative Nolan, of California, is chairman. The mine workers have been able to emphasize again and again that the operators refuse to enter into a national conference. The operators' explanations apparently are entirely satisfactory to most of the persons conversant with the coal industry, but the public generally is not grasping them. There is every indication that the strike will be an extended one.

Railroad Rates

Due to differences of opinion among the members of the Interstate Commerce Commission, it seems probable

there will be some delay in handing down an opinion in the case in which the commission is considering reductions in railroad rates. Some members of the commission believe that the financial situation of the railroads at this time will not permit of any reductions. Other members of the commission are said to be in favor of a general reduction in all commodities, while still others would confine the reduction to basic commodities. Most large purchasers in making contracts are insisting upon a clause which provides that they are to have the benefit of any reduction which may be made in freight rates.

Patent Legislation

Such determined opposition against compulsory working of patents was shown at the first Senate hearing on the subject, held April 6, that it has been decided to redraft the bill eliminating specific limitations of five and two years. The new bill will provide that all patents are to be worked within a reasonable time, but the length of time is to be left to the judgment of the Commissioner of Patents. The Commissioner of Patents, himself, is strongly opposed to the legislation, declaring it is imperative, if invention is to be encouraged, for the patentee to have a monopoly. A further hearing will be had April 18.

Tariff

As this is written it is expected that the Senate finance committee will complete its work on the tariff bill on April 12. Apparently the judiciary committee of the House of Representatives is disinclined to take away any of the authority of the federal courts in their jurisdiction over orders issued by state public utility commissions. Representative Bacharach of New Jersey, is pressing a bill which would take away from the federal courts the right to issue injunctions against utility commission orders.

Former Senator Thomas, of Colorado, who appeared at the hearing for the public utility companies, declared that he cannot conceive of a more iniquitous statute than that proposed. It seeks to deny the federal courts, he said, the right to preserve the property and the rights of individuals, pending the determination of a constitutional question.

Seattle Company Purchases Large Timber Holdings in Washington

The M. R. Smith Lumber and Shingle Company of Seattle has entered into a contract with the U. S. Bureau of Indian Affairs for the purchase of 305,000,000 feet of timber in the Grenville Indian reservation tract at Taholah, in the Grays Harbor country. The company's bid for the timber was \$650,000. Under the terms of the contract, the lumber company must remove 15,000,000 feet of the timber before March 31, 1924 and at least 25,000,000 feet annually thereafter. All of the timber must be cut and removed before March 31, 1935.

Colorado Commission Finishes Western Hearings

Secretary Hoover and State Representatives Adjourn to Attempt Formation of Equitable Water Distribution Pact

"If we can find some basis for the equitable division of the waters of the Colorado, we will have advanced development by at least a quarter of a century over what will result if these matters are handled through the courts."

In the above statement Secretary of Commerce Hoover, chairman of the Colorado River Commission, summed up the problem which is confronting the commission at the present time at a hearing held in Salt Lake City recently, one of a series which have been held in each of the states comprising the Colorado Basin. Testimony has been taken in Los Angeles, Phoenix, Salt Lake City, Denver and Cheyenne in an effort to determine the attitude of the several states on the various proposals which have been made regarding the development of the river.

The two considerations in which the commission is most interested at the present time are the construction of the Boulder Canyon dam on the lower Colorado and the formation of a pact or treaty between the several states relative to an equitable distribution of water over periods variously placed at from twenty-five to fifty years. It has been the commission's idea in drawing up such a pact to prevent any one of the several states from starting litigation which might tie up any project which might be undertaken.

Various proposals have been made at each of the hearings held as to the provisions of such a treaty or pact. Reports of those presented at the Phoenix and Los Angeles hearings were printed in the April 1 issue of the Journal of Electricity and Western Industry.

Other proposals were presented at the meetings in Salt Lake City and Denver. Utah officials have proposed that no limit be placed on the amount of water to be used by the states in the upper basin so long as this amount does not seriously affect the states in the lower basin. Another proposal is that the flow of the river at the Utah-Arizona state line shall at no time be less than fifty per cent of the flow of the river at the present time. Still a third proposal is that each of the upper states be allotted water in proportion to its irrigable lands, but that this allotment shall not exceed thirty-five per cent of the total flow of the river.

Of interest to the commission was an entirely new suggestion made by the irrigation proponents of Colorado and members of the Denver Water Commission. The irrigationists contend that half a million acres of arid land on the eastern slopes of the Rocky Mountains can be irrigated provided water from tributaries of the Colorado River can be carried across the mountains. The city of Denver is seeking 250,000 acre-feet of water annually from the headwaters of the river to be carried across the mountains as a municipal water supply.

Up to this time the matter of carrying water outside the limits of the basin has not entered the discussions.

Future meetings will be held either in Washington or at points in the basin to be specified at a later date. For the present the various members will consider the mass of data which has been presented at the hearings just concluded.

Conditions in Utah Point to an Early Return to Normal

Conditions with respect to the development of Salt Lake City and Utah are considered highly optimistic at the present time, according to an editorial recently published in the Salt Lake Tribune calling attention to facts and figures concerning the situation in the Intermountain district. Excerpts from the editorial follow:

The credit extensions of the war finance corporation in this district have provided a most welcome relief to many hard-pressed agricultural interests. These advances have reached a total for Utah and Idaho of \$12,536,317.28. Of this amount, \$8,796,000 was loaned to the sugar-producing companies of the two states. In Utah, \$1,102,480 has been loaned for livestock and other agricultural purposes. In Idaho, \$2,637,837.28 has been loaned. Already \$2,066,522.28 has been repaid by the borrowers, and the purpose of the loans—to tide the borrower over his difficulties—has been accomplished. Further repayments will be made constantly and consistently.

In the industrial field Utah is counting, and with good reason, upon the development this year of a steel industry which before much time elapses will be a dominant force in the state. It can be asserted with assurance that at least one blast furnace, and possibly more, will be in the course of construction this year. The beginnings of the steel industry will be of great significance, and will give Utah an impetus which cannot be measured.

Construction of all sorts is due to get under way this spring and summer. This work will come under the classifications of industrial building, home construction and road building for the most part. Among the major pieces of city construction will be the erection of the Elks' building in Salt Lake, the probable beginning on the Salt Lake branch of the reserve bank, and the completion of the new West high school. Several apartment houses and a very large number of new residences are being planned for erection.

Mining is another industry important to this section which is entering more prosperous days. Silver mining has held up, and is increasing. Improvement in the lead market has helped producers of this metal, while the copper situation steadily improves. Because of the size and unusual character of its operations, the shut-down of the Utah-Copper mines at Bingham was held to be perhaps of greater significance to the community than actual facts justified. And that property is expected to resume within a measurable time.

So there are many, many reasons besides the weather, why the citizens of the intermountain country can be happy at the present course of events.

C. M. & St. P. Railroad to Spend \$10,000,000 in Northwest

Announcement is made by Macy Nicholson, western general manager of the Chicago, Milwaukee and St. Paul Railway, that of the \$10,000,000 to be expended by the company in the next few months, the sum of \$250,000 will be expended in re-laying the main line track between Seattle and Tacoma. The line which is now laid with 85-pound rails, will be replaced with 94-pound rails. Of interest to the Northwest is the announcement that the company will shortly award contract for 4,000 new box cars, for which the lumber will be purchased in the Pacific Northwest at a cost of approximately \$800,000. About 20,000,000 feet will be required.

Would Interconnect Seattle and Tacoma City Power Lines

To provide an outlet for surplus power from the city's Skagit River hydroelectric project for the first two years after it is completed, the municipal light plants of Seattle and Tacoma will be connected, so that current of either city will be available for distribution in both cities, if recommendations made by the city council utilities committee of Seattle are approved by the legal department and the city council as a whole.

The Tacoma city council has approved a resolution providing for such an interconnection, and Supt. J. D. Ross of the Seattle municipal power plant strongly urges the step. He estimates the cost of the 25-mile transmission line necessary at \$150,000. The line will probably run from the Tacoma sub-station at South 24th and C streets to connect with the Seattle line at Renton; each city will supply and install the switching and measuring equipment at its own end; each city will acquire the right-of-way in its respective county and construct such part of the line, the supplies to be purchased by one or the other; the cost of the line to be divided equally; that each city supply the other surplus power available for either commercial or emergency use to the capacity of the intertie line, the rate to be one-half cent per kilowatt-hour for water-generated current, and double this for steam-generated current.

Resolutions were adopted at the recent meeting of the Washington State Chamber of Commerce at Olympia, calling upon all commercial organizations in the state to use every effort to encourage the development of the hydroelectric resources of the Northwest. The same meeting also endorsed the adoption of a state legislative policy for reclamation and development of idle lands.

Seattle Commission to Investigate Industrial Situation

Adopting by unanimous vote a resolution recently introduced, the Seattle city council recently requested Mayor Hugh M. Caldwell to call an industrial conference for the near future, and to invite each of the following organizations to send three representatives: Chamber of Commerce, Employers' Association, Seattle Clearing House Association, Building Trades Council, Building Material Dealers' Association, Associated General Contractors and Central Labor Council.

The resolution declares that existing industrial disputes and the prevalence of excessive building costs are retarding the building operations in Seattle. Plans for the conference are well under way.

The Oregon Charcoal-Iron Company has announced that it will erect a \$200,000 furnace for the manufacture of pig iron from the company's 1000-acre ore field near Scappoose, Oregon. This \$325,000 concern, headed by A. W. Martin, estimates that it will be possible to turn out a high grade of pig iron at a cost of about \$16.00 a ton.

Denver Gas and Electric Light Company Promotes Officials

A number of promotions for employees of The Denver Gas and Electric Light Company have been made as the result of the action taken by the board of directors of that company on March 27, when the successor to William J. Barker was elected.

Clare N. Stannard, for many years secretary and commercial manager of the company, was elected vice-president and general manager, a position which has been vacant since Mr. Barker's death several months ago. Mr. Stannard is active in the civic and commercial life of Denver and is an imposing figure in the electrical industry. He is president of the Electrical Home Building Company, that part of the Denver Electrical Cooperative League which is building the first model electrical home in that city.

Rufus G. Gentry, assistant commercial manager of the company, was appointed commercial manager in Mr. Stannard's place. He is a member of the advisory committee of the Electrical Cooperative League in Denver. As acting secretary the treasurer of the company, Harry Hughes, was elected.

S. F. Bond Company Will Install Radio Broadcasting Station

The prediction of the promoters of the radio telephone that this means of communication will soon be used by big business firms to keep in touch with their various branches was made practical recently when the bond house of Cyrus Peirce and Company announced its intention of installing radiophones in each of its ten branches throughout California and other Pacific Coast states.

Preparations have already been started by the company for the establishment of a 500-watt broadcasting station on the Insurance Exchange building in San Francisco.

When this equipment is established, the company will send to its branches several times a day news of bond issues and prices. Officials of the company said that the radio telephone system will be in operation in four or five weeks, when the company will take over the entire tenth floor of the Insurance

Exchange building next month. The ten branches of Cyrus Peirce and Company are located in Seattle, Los Angeles, San Diego, Pasadena, Santa Barbara, Fresno, Eureka, Stockton, Oakland and San Jose.

\$5,000,000 Hotel Project in Los Angeles Is Under Way

It is of interest to note that western firms in competition with builders from the East secured the principal contracts for the Biltmore Hotel now under construction in Los Angeles. This building project is of special interest at this time because it will represent the largest single sum of money ever expended in the West for hotel facilities.

Schofield Engineering Construction Company, of Los Angeles, was awarded the general contract for a sum in excess of \$5,000,000. Llewellyn Iron Works will furnish and install all electric elevators, control wiring and signal systems, together with the structural steel frame for the entire building. Their bid amounted to \$636,687.50. Excavation for the foundations is started under a contract given to C. A. Edwards. The hotel will be rushed to completion at the earliest possible date. The electrical installation for light and power has not been contracted for as yet.

Wages of metal workers in the cities adjacent to San Francisco bay will be cut 10 per cent beginning April 17 as the result of a decision of the California Metal Trades Association. Under the new order the basic wage of skilled workmen is set at 64 cents an hour. This is the second cut since the basic rate on government work in October, 1918. The American plan has been in force in the metal trades industry for almost six years.

The packing and manufacturing plant of the California Peach and Fig Growers in Fresno was totally destroyed by fire on March 31 with a loss estimated in excess of \$150,000. The building which was owned by the Guggenhome interests was valued at \$30,000, the machinery and equipment at \$20,000 and the stock stored in the plant in excess of \$100,000.

Work of War Finance Corporation Outlined by Eugene Meyer

Eugene Meyer, Jr., managing director of the War Finance Corporation, spent several days in Salt Lake City recently, investigating the activities of the local office of the organization. Mr. Meyer is making a tour of the country for the purpose of making such investigations, the result of which he will report to President Harding.

Speaking of conditions generally, Mr. Meyer said:

"Throughout the corn belt in the middle west, in California and in other sections we have already visited there has been a universal verdict that economic conditions have improved. The farmers are in better position, the banks are stronger, practically all elements feel certain that the worst is past.

"I want to compliment the members of the Utah agency of the corporation and those who have been associated with them for the admirable cooperation they have shown in facilitating the advances of the corporation in this section. Utahns should know, too, that the example set by the organization here of the Bankers' Loan Company as an instrument for handling the advances of the corporation has been followed with the greatest success in many other cities. Last fall the day after I left Salt Lake I told the bankers and others interested at Cheyenne of the organization formed in Salt Lake and on the spot they started a corporation with a capital of \$200,000, which has since been increased to \$1,000,000 and has proved of great benefit to the livestock, agricultural and financial interests of Wyoming.

"The general improvement in the prices received by the producers for farm products and livestock has been of major importance. That the work of the corporation has proved of benefit is demonstrated by the fact that since January between \$25,000,000 and \$30,000,000 of the loans made has been repaid.

"Through local agencies the corporation has been happy to be of service to the sugar industry, to which between \$9,000,000 and \$10,000,000 has been loaned, and to the livestock and general agricultural producers."

Mr. Meyer held a series of conferences with the officials of the Utah agency of the corporation, with the officers of the Bankers' Loan Company, the Sugar Beet Finance Corporation and the Western Livestock Loan Company, and a public discussion as to the results achieved by the corporation and its aims.

The San Francisco Development Association has announced that the first of its annual Home Beautiful and Building Construction expositions will be held in the municipal auditorium of that city April 25 to May 2.

WHERE CALIFORNIA WILL STORE WATER FOR A \$12,000,000 IRRIGATION PROJECT.

Two views of the Exchequer damsite on the Merced River in Mariposa county, California, where water will be stored for the Merced Irrigation District. Twelve million dollars is being spent on this project. The view on the left shows the height of the proposed dam, 310 feet above the

surface of the stream. The other view is looking upstream from the dam-site, showing the partially destroyed dam of the old Exchequer Mining Company which was washed out several years ago. At the present time exploration work is in progress.



Radio Show in Seattle Will Be Feature of Radio Week

Seattle will stage a Radio Show, said to be the first of its kind held outside New York City, during the week of April 23-29, proclaimed by Mayor Hugh M. Caldwell as Radio Week. Preliminary plans made by the Seattle Radio Association and the Totem Radio Club, provide for using The Arena as the location, and for securing exhibits from practically all of the twenty-two leading firms dealing in and manufacturing radio apparatus. An interesting exhibition will be staged by the radio laboratory of the Puget Sound Naval Yard. Among the details planned are the setting up of several transmitting sets, one, for instance, to be operated for transmission of message to the receiving sets inside the exposition hall and the other to broadcast for Seattle and the Puget Sound district.

Competitions among amateur operators in receiving and sending code messages will be staged, with prizes awarded. The objects of the Seattle associations backing the Show are, first, to give Seattle an opportunity to see and understand the radio, and secondly, to raise funds for the establishment of a publicly-owned and conducted transmitting station in Seattle, which will be second to none in the West.

Seek Constitutional Amendment Against Tax-free Securities

A constitutional amendment prohibiting the further issuance of tax-exempt securities by states and municipalities has been recommended to the house committee of ways and means in Washington, D. C., by representatives of the national government, public utilities and large industrial concerns. Secretary of the Treasury Mellon was one of the chief advocates of such an amendment before the committee at a recent meeting. Public utility representatives pointed out that capital needed for improvements and extensions is going into tax-exempt securities despite the fact that private corporation bond issues are offering interest rates far in excess of those offered by states and municipalities.

Oregon Iron & Steel Co. Finishes Power Plant Near Portland

Construction of a reinforced concrete dam 360 feet long and 30 feet high above the bed of the creek, at the outlet of Oswego Lake, has just been completed by the Oregon Iron and Steel Company, enabling the company to double its plant capacity. An earthen dam dike one foot above the level of top of dam extends around the foot of the lake, a natural body of water about three miles long and half a mile wide which is fed and considerably enlarged by a canal from the Tualatin River. The importance of the plant is in its location only eight miles from the business center of the city of Portland with 260,000 people.

The power house is a concrete structure large enough to house two units or double the present capacity which consists of a 500-kva., 2300-volt Westinghouse generator, direct connected with water wheel and exciter. The total length of the pipe line and penstock is

1200 feet and the effective head is 85 feet.

The Oregon Iron and Steel Company, manufacturing cast-iron products, will use some power and will also supply lighting current to the villages of Oswego, Oak Grove, Lake Grove and other rural points, and in any emergency its current can be switched to the lines of the Portland Railway Light and Power Company or the Northwestern Electric Company supplying the city of Portland with light and power. In serving scattered rural communities the current is now carried over about 60 miles of wire.

S. P. Company Announces Cut in Freight Rate on Poles

A substantial reduction in freight rates on poles and piling, made in conjunction with the Oregon, Washington Railroad and Navigation Company, from Portland, Seattle, and other points in western Washington and Oregon, to San Francisco, Oakland, Stockton, Sacramento, Weed and all points in northern California, has just been announced by the Southern Pacific Company.

The present 44c. per 100 lb. rate from Portland and western Oregon points will be reduced to 37c. per 100 lb., and the present 51c. per 100 lb. rate from Seattle and western Washington points will be reduced to 14c. per 100 lb.

This change in rates is offered as an emergency measure and, by authority of the Interstate Commerce Commission, will go into effect ten days after filing instead of the customary thirty days.

According to figures recently compiled by J. Cecil Alter, meteorologist in charge of the Salt Lake City weather bureau, the total annual number of dark hours in Salt Lake City is 2097.7, amounting to 87.4 days, which is approximately 24 per cent of the year. The monthly percentages of the total annual dark hours between 6 a.m. and 11 p.m., which in average or usual conditions may be comparable to the total consumption of lighting or illuminating energy, are as follows: January 12.1 per cent; February 9.8; March 8.3; April 6.5; May 5.8; June 5.2; July 5.4; August 6.1; September 7.2; October 9.5; November 11.5; and December 12.6 per cent.

Purchased at the rate of \$1,800 each the U. S. Shipping Board's entire Lake Union fleet of forty-three wooden vessels has been delivered to the Barde Industrial Company of Seattle. The company closed a deal recently by which it purchased the Lake Union vessels and all the other uncompleted wooden vessels owned by the Shipping Board on the Pacific Coast. The company will sell the vessels.

An expenditure of \$19,000 for surveys and \$146,000 for actual construction of national forest roads is included in the program for Utah during the coming year, according to an announcement made by B. J. Finch, district engineer for the federal bureau of public roads. Twenty-seven miles of roads are to be constructed under the program and approximately sixty surveyed.

Books and Bulletins

Practical Electrical Engineering

By HARRY G. CISIN, M.E., Engineering Editor, "Electrical Record." 5½ by 8. 324 pages. 68 illustrations. D. Van Nostrand and Company, New York.

Practicability and simplicity are the keynotes of this book which deals only with the basic principles of direct current engineering. One of the chief features which will recommend it to the use of the practical man who has had no technical training is its freedom from algebraic proofs and problems. The knowledge of simple arithmetic alone is essential for its comprehensive study. The book deals with the definition of the practical units, a discussion of the fundamental laws, and then carries the student through the various principles underlying electrical engineering. One of the chief features is the appendix which contains a complete laboratory course of twenty experiments which are supplementary to the text. For the man who has gained his knowledge of things electrical by actual practice and to the man in the industry who has neither the opportunity nor the time to gain a general knowledge of electricity, the book will fill a long-felt want.

The Government Printing Office at Washington has just issued an elementary book on radio communication entitled "The Principles Underlying Radio Communication." Copies of the book may be obtained from the Superintendent of Documents at \$1 each.

The Electric Power Club of St. Louis has prepared a new controller handbook containing simple descriptions of the various controllers for electric motors and definitions of the terms used in this connection. The handbooks may be obtained from leading manufacturers of electric power and control apparatus or from the Power Club.

The Ideal Electric and Manufacturing Company, Mansfield, Ohio, has just issued two complete bulletins, one on alternating current motors and the other on direct current motors manufactured by the company. Both are well illustrated.

A new catalog has just been issued by the Chicago Fuse Manufacturing Company of Chicago, on electrical protecting materials and conduit fittings. This catalog contains 96 pages with 445 illustrations. It is a veritable encyclopedia that should be in the hands of everyone interested in such electrical devices.

The Grays Harbor Railway and Light Company, Aberdeen, has announced through its president, E. N. Sanderson of New York, who recently investigated the company's holdings in Washington, that the company will carry out plans for the development of the hydroelectric power possibilities on the Wynooche River. The company recently had additional equipment which will provide 5,000 horsepower installed in their power plant in Hoquiam. This gives the company 12,000 horsepower in its Hoquiam plant.

Meetings of Interest to Western Men

Wyoming Utility Association Holds Successful Session

Utility men from all parts of Wyoming gathered at Cheyenne on April 10 and 11 for the annual meeting of the Wyoming Utility Association. The meeting was characterized as one of the most successful in the history of the organization.

The program for the sessions follows:

Monday, April 10

9:30 a.m.—Registration.

Morning Session, 10 a.m.—Welcome Address, Ed Taylor, Mayor of Cheyenne; Address of the President, C. A. Semrad, The Cheyenne Light, Fuel and Power Co.; "Cooperation in Business," S. W. Bishop, executive manager, Electrical Cooperative League, Denver; Activities in the National Electric Light Association, E. P. Bacon, Natrona Power Company, Casper, Wyo.; "The Value of Publicity," Geo. E. Lewis, executive manager, Rocky Mountain Committee on Public Utility Information.

Afternoon Session, 2 p.m.—"Customer Ownership," Norman Read, The Colorado Power Co.; "Public Relations," J. S. Greenawalt, The Mountain States Telephone and Telegraph Co.; "Budgeting as an Incentive to Efficient Utility Operation," O. A. Weller, The Denver Gas and Electric Light Co.

Evening, 7 p.m.—Banquet at Cheyenne Country Club.

Tuesday, April 11

Morning Session, 10 a.m.—"Main Factors Entering into a Public Utility Rate Regulation," H. B. Dwight, Colorado Public Utilities Commission; "Some Recent Decisions Affecting Rights of Public Utility Stock Holders," P. W. Lee, attorney, Fort Collins, Colo.; "The Value of a State Organization," F. R. Norcross, Home Gas and Electric Company, Greeley, Colo.

Architects and Builders Listen to Electrical Home Story

The part to be played by the architect and builder in the electrification of the modern home is being emphasized at a series of meetings being held before the various electrical associations in California. Under the auspices of the California Electrical Cooperative Campaign, "Architects and Builders Day" is being celebrated by these various organizations, with each member of the electrical industry charged with the duty of bringing an architect or builder to the meeting.

On March 27 the San Francisco Electrical Development League was host to 150 architects and builders of that city, to whom the story of the electrical home and the convenience outlet was brought home in a forceful manner. Garnett Young, president of Garnett Young and Company, San Francisco,

told the electrical industry's story illustrating his arguments for cooperation on the part of the architect and builder by stating figures relative to the annual sales of the various types of popular household appliances. Mrs. Belle DeGraf, domestic science director for the California Prune and Apricot Growers' Association and editor of the domestic science page of the San Francisco Chronicle, gave the housewife's version of the necessity for convenience outlets.

The chief feature of the meeting was the presentation of a two-act playlet, written by Frank N. Smith of the California Electrical Cooperative Campaign, which realistically compared the conveniences of a home not properly equipped for the use of electrical appliances.

A similar story was told to the architects and builders of San Diego at a meeting of the Electric Club on April 4, with Garnett Young again acting as the chief speaker for the electrical industry. Meetings of a like nature were held by the Oakland Electric Club on September 19 last year and by the Los Angeles Electric Club on November 28.

Ralph Budd, president of the Great Northern Railway, in Seattle recently, announced that his company has already begun the expenditure in Washington of several million dollars of a \$15,000,000 rehabilitation and improvement budget for 1922. Work has been started on a double-tracking contract in eastern Washington, near Spokane, that will cost \$1,000,000. Mr. Budd also stated that his company will spend \$1,500,000 in improving fifty acres of land recently purchased for terminal purposes in Wenatchee, which will make the Wenatchee terminal one of the finest in the state.

Data for a booklet, showing the agricultural resources of Utah, is being prepared by a special committee appointed by the agricultural committee of the Salt Lake City Commercial Club. The booklet will show the number of farms in the various counties, statistics on irrigation and drainage, the character of the land and climate in the different sections of the state and the products developed. The special committee appointed to collect data includes E. M. Ledyard, E. G. Titus and G. C. Dunford.

First Denver Electrical Home to Open on April 30

With reasonable certainty the opening of the first model electrical home in Denver has been set for April 30th, according to S. W. Bishop, executive manager of the Electrical Cooperative League, the organization which has built the home.

Outside of the original difficulty in arranging for a house to be displayed, it is reported that the Denver electrical interests have not encountered any serious obstacles in completing the project and with good weather during the exhibition period a record breaking attendance is expected.

When first launched, plans for the Denver home provided for its completion and display before the last holidays. Then with a change in the scheme of financing, it was hoped the house would be finished in March. At that time the only severe cold weather of the winter season delayed the plastering and stucco work.

However, the last delay impressed the League advisory committee so strongly, it is said, that the line-up was modified to insure the showing of the house in the best season of the year. Experience in Cleveland and other cities has strongly recommended the month of May, with the result that the Denver home will be open the most, if not all, of the month, according to reports.

The automatic garage door opener, the ventilating and exhaust fans, the hot water heater, some of the laundry equipment, and the heaters for the fireplaces are already installed, and with the other appliances instantly available no difficulty is anticipated in completing arrangements for the display.

Word received from the Electrical Cooperative League states that all of the electrical men in the Rocky Mountain region are invited to attend the exhibition some time during the month.

Specifications have been issued to Pacific Coast shipyards for the construction of two electrically operated steel ferry boats by the Key Route Ferry Company of Oakland, to be used on San Francisco bay. The vessels are estimated to cost approximately \$300,000 each. Bids will be opened on May 1st. The specifications call for one direct current turbo-generator set of 1000-kw. capacity which will operate a direct current motor geared to the propellers.

Returns for 1921 show that electrical utilities absorbed by far the greatest amount of capital provided for in new incorporations and enlargements of existing companies in Japan. New projects were capitalized at 187,430,000 yen (\$93,715,000), and increases of capital by old companies totaled 654,099,000 yen (\$227,049,500). The next largest figures were shown by manufacturing projects and were, respectively, 296,446,000 yen (\$148,223,000), and 158,275,000 yen (\$79,137,500).

The next regular meeting of the Southern District of the California State Association of Electrical Contractors and Dealers will be held at Balboa on April 22 and 23, according to present plans.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

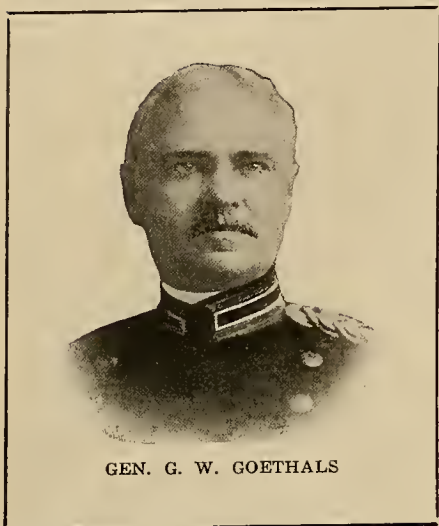
PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

PACIFIC COAST DIVISION, ELECTRICAL SUPPLY JOBBERS' ASSOCIATION

Quarterly Meeting—Del Monte—April 27-29, 1922

Major General George W. Goethals, builder of the Panama Canal and one of the foremost engineers in America, has announced that his firm, George W. Goethals and Company, Inc., will establish offices in San Francisco for the general practice of engineering in its broader aspects, extending its service to public and private corporations and associations and to financial interests



GEN. G. W. GOETHALS

of the Pacific Coast. General Goethals determined to extend his activities to the Pacific Coast following his recent investigation of the Columbia Basin project for the state of Washington. At that time he visited various sections of the West, noting the engineering developments which are rapidly placing the section west of the Rocky Mountains to the forefront in engineering achievement. His company will be represented in San Francisco by F. Emerson Hoar, consulting engineer, who at the same time will continue his private practice.

John A. Britton, vice-president and general manager, and W. G. Vincent, executive engineer of the Pacific Gas & Electric Company, have returned from an eastern trip covering several weeks' duration, and report great enthusiasm being manifested over the forthcoming national convention of the National Electric Light Association to meet at Atlantic City the middle of May.

J. E. Woodbridge of Ford, Bacon & Davis with headquarters at San Francisco, has left for a business visit to the East for the purpose of investigating electric arc welding and other recent processes in penstock pipe installation.

C. A. Pope, advertising manager for the Hendrie and Bolthoff Company of Denver, addressed the advertising bureau of the Denver Civic and Commercial Association, April 4th.

K. E. VanKuran, Los Angeles district manager for the Westinghouse Electric and Manufacturing Company, will make an extended trip through the East visiting the different branch factories of his company. He will leave during April but contemplates returning to the Pacific Coast in time for the Pacific Coast Electric Association convention which is to be held in the Ambassador Hotel, Los Angeles.

George Lewis, executive manager of the Rocky Mountain Committee on Public Utility Information, spoke to the Lions' Club of Lafayette, Colorado, the night of March 28th.

Personals

F. R. Davis, advertising manager of the General Electric Company, after a sojourn of several weeks in Pacific Coast centers, namely, Los Angeles, San Francisco, Portland and Seattle, is again back in his Schenectady headquarters thoroughly imbued with the tremendous possibilities of the empire in the making which lies west of the Rocky Mountains.

E. N. Hurley, president of the Hurley Machine Company and formerly head of the U. S. Shipping Board, is again back at his Chicago headquarters after a visit of several weeks' duration in the West, investigating the possibilities of locating a factory branch representing an investment of something like a million and a quarter dollars in one of the growing industrial districts of the West.

John R. Millar, president of the California Manufacturer's Association with headquarters at Oakland, California, is busily engaged in revising the Code of Ethics under which the California Manufacturer's Association is operating. This association is doing excellent work for the upbuilding of industry throughout the West under the able leadership of Mr. Millar.

Harrison S. Robinson, at attorney-at-law of Oakland, California, who has taken an unusual interest in the bettering of industrial relations throughout the West, is now engaged in reorganizing these activities which have proved so successful during the year, and it is believed that the industrial relations activities will go forward during the coming months with increased vim and vigor.

Preston S. Miller of the Electrical Testing Laboratories of New York, is touring the Pacific Coast in the interests of his company, which is one of the largest in the country devoted entirely to the testing and inspecting of electrical materials.

Stuart Mannell, exporting and importing engineer of Seattle and president of the Seattle Engineers' Club, is a recent San Francisco visitor, having come to this city for the purpose of conferring with foreign trade experts on matters relative to the export and import business.

W. M. Shepard, consulting engineer for the California-Oregon Power Company of Medford, Oregon, spent several days in San Francisco recently dealing with matters relative to the 112-mile interconnecting transmission line which will link the power systems of California with those of the state of Oregon.

C. A. Williams, range sales manager of the Great Western Power Company, has resigned from his position. J. W. Wrenn, for many years connected with the sale and distribution of electrical appliances on the Pacific Coast, has been appointed to fill the vacancy.

George W. Bixler, of the Denver Gas and Electric Light Company and secretary of the electrical bureau of the Denver Civic and Commercial Association, has been appointed captain of a team in the membership drive being conducted by that organization.

R. E. Chatfield, executive secretary of the British Columbia Electric Service League, has returned again to Vancouver after an absence of several weeks in California where he investigated the work of the California Electrical Cooperative Campaign, and incidentally carried back with him a California bride.

D. G. Irions, formerly connected with electrical trade papers in the East, has located in Denver and intends to establish himself as the representative of a number of eastern manufacturing concerns.

Professor Royal W. Sorensen, director of the department of electrical engineering at the California Institute of Technology, has returned from the East where he made the concluding arrangements for the apparatus to equip the new high tension laboratory of the college. In the selection of the design for the 4-250,000-volt, 250-kva. units which make up the main portion of this 1,000,000-volt, commercial frequency, laboratory, Professor Sorensen has deviated from past practice in theory of design and principle of assembly. Flexibility of operation is attained and the simplified construction will no doubt be a feature of future developments in extremely high voltage transformer installations. Since coming to the California Institute of Technology in 1910, then called Throop Polytechnic Institute, Professor Sorensen has had much occasion to combine his college work with the practical problems of the electrical industry in the West, and believes this to be necessary to avoid any tendency in the collegiate training to drift away from the practical engineering field. From 1913 to 1917 he was retained by the Pacific Power and Light Corporation as consulting engineer in connection with the Big Creek developments and the transmission of power at 150,000 volts. In 1917 to 1919 he was largely instrumental in designing the present line of induction motors



R. W. SORENSON

manufactured by the U. S. Electric and Manufacturing Company of Los Angeles. Original research in the insulation fatigue of suspension insulators and radio-engineering investigations have been contributed to the engineering profession in technical papers by Professor Sorensen. He looks forward to the no distant date when 400,000-volt transmission will be in commercial operation in the West.

W. R. Putnam, president of the Northwest Electric Light and Power Association with headquarters in Boise, Idaho, is busily engaged in formulating the definite program for the annual convention which will meet at Boise, June 7-10. Public relations and new advances in hydroelectric technical research will be the points emphasized at the forthcoming gathering.

L. M. Klauber, superintendent of the San Diego Consolidated Gas and Electric Company, gave an interesting talk on the present tendencies in steam turbine design before the San Diego Electric Club on March 28, presenting some interesting data gathered during his recent trip to the East.

Charles F. Gross of Baltimore, former instructor in the United States Naval Academy and later associated with the Union Shipbuilding Company, has been appointed assistant professor of marine engineering and naval architecture in the College of Mechanics of the University of California. Mr. Gross is a member of the Society of Naval Architects and Marine Engineers and the American Society of Naval Engineers. The University of California bids fair to be the center for technical training along this line on the Pacific Coast.

Clarence Keeler, manager of production for the Denver Gas and Electric Light Company, and recently elected president of the Denver Contractor-Dealers' Association, is the first central station man to head this association. His entire experience in the electrical industry has been with the Denver central station company. He entered the employ of this company in March, 1896, shortly after coming to Denver from Anamosa, Iowa, his birthplace. In 1913 his department supervised the \$50,000 decorative lighting installation for the Knights Templar conclave. That same year he started developing the fixture and sign business of the company. His progress can be appreciated when it is known that the annual volume of busi-



CLARENCE KEELER

ness in this department has increased from \$800 in 1913 to \$150,000 in 1921. Since the reorganization of the Contractor-Dealers' Association in January, 1921, he has been most active in its affairs, serving as chairman of the fixture division until his election as president. He is also one of the central station representatives on the advisory committee of the Denver Electrical Cooperative League.

Eugene Meyer, managing director of the War Finance Corporation, which has been directly responsible for the rehabilitation of the live stock and agricultural industries of the West through the loans which have been advanced during the past year, is visiting the various cities of the Pacific Coast investigating the various branches of the War Finance body. He reports that the agricultural and livestock industries are on the up grade at the present time.

H. T. Plumb, engineer at the Salt Lake City office of the General Electric Company and George Quinan, electrical engineer for the Puget Sound Power and Light Company, are the two candidates from District 9 for the vice-presidency of the American Institute of Electrical Engineers. Frank B. Jewett, vice-president of the Western Electric Company and well known to all western engineers, is the only nominee for the president of the institute.

W. E. Thorne, consulting engineer in the gold fields of South Africa, gave an interesting talk before the San Francisco Engineers' Club on March 30 on "Exploration and Development in the Heart of Africa," painting a graphic word picture of the vicissitudes of the engineer's life in the bush.

Frank W. Frueaiff, president of the Denver Gas and Electric Light Company, who recently visited Denver to attend a meeting of the directors of that company, declares that the financial condition of the country is improving rapidly and that stabilization in all industries will soon be reached.

C. C. Thomas, Pacific Coast representative of Dwight P. Robinson and Company, Inc., has returned to his Los Angeles headquarters after attending the recent bi-monthly meeting of the council of the American Society of Mechanical Engineers which was held in Kansas City March 6 and 7.

M. H. Aylesworth, executive manager of the National Electric Light Association, expects to be in attendance both at the Pacific Coast Electrical Association Convention at the Ambassador Hotel, Los Angeles, May 31-June 2, as well as the Northwest Electric Light and Power Association Convention at Boise, Idaho, June 7-10.

Garnett Young, president of Garnett Young and Company and a member of the California Electrical Cooperative Campaign, is doing some excellent work throughout the state in presenting the electrical convenience outlet plan for new home building at a series of dinners held by various electrical leagues throughout California.

Max Loewenthal, president of the Globe Commercial Company, San Francisco, has recently returned from an extended trip through the East, visiting the various factories which his firm represents, and attending the radio conference at Washington as official delegate of the Pacific Radio Trade Association. Mr. Loewenthal presented the Pacific Plan to the conference, some details of which have been incorporated in the final recommendations. Mr. Loewenthal also attended the New York Radio Show and gave a number of talks on radio activities in the East before several electrical and civic organizations of the middle west. He has found great optimism everywhere so far as it relates to the electrical merchandising business.

P. L. Goddard has been appointed executive secretary of the Rocky Mountain Electrical Cooperative League, to succeed Charles H. Talmage, who resigned several weeks ago. Mr. Goddard entered the electrical field in the early part of 1913, in the cost engineering department of the Phoenix Construction Company. He later served in the purchasing and power departments of the



P. L. GODDARD

Utah Power and Light Company in connection with construction and reconstruction work. About four years ago he resigned to become actively associated with the Hawaiian Electric Company. While in the employ of the Hawaiian Electric Company Mr. Goddard assisted in organizing the Mid-Pacific Electrical Cooperative Campaign. He also compiled and edited a weekly electrical page in one of the newspapers, was very active in the promotion and exploitation of the Honolulu Home Electrical, assisted in organizing an employees' association, inaugurated a house organ for the Hawaiian Electric Company, and edited same until he resigned to return to the mainland in the later part of July, 1921. Mr. Goddard is an enthusiastic advocate of all the principles upon which the league is founded, and has entered into his work with a determination to carry on its activities in such a way that will bring continued and even greater success to the league and to the electrical industry in general in the intermountain section.

Walter C. Wurfel, president and sales manager of the Electrical Supplies Distributing Company and president of the San Diego Electric Club, has returned from a trip to the Bay cities, where he attended the convention of the Pacific Coast district of the Rotary Clubs and at the same time visited several of the electrical organizations in that section of California.

H. J. Gute, manufacturing agent of San Francisco, has just returned from a business trip to Denver and other cities in the Intermountain district.

A. F. Kirtland, who has been covering the western territory for the Henry Hyman Company, has gone East on an extensive business trip.

Ralph J. Dinwoody, sales manager of the Intermountain Electric Company of Salt Lake City, has returned from an eastern visit to the various industrial centers. He reports that general business activity throughout the larger cities is very much improved.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

The late winter snowfalls have been exceptionally heavy in the high Sierras this year, and while these late snows are not usually as great in percentage of water content as the earlier snows, the unusual depth attained has had the tendency to pack the mass into solid ice. This assures ample water for power and irrigation in California the coming season.

Farming and mining work were retarded by severe weather conditions, and there was but slight call for agricultural workers. Spring plowing has just started. Building operations give promise of increased activities. Lumber is active, and steel and iron show a little improvement, but are still below normal.

Business was exceptionally good in hay and grain during the past month. The early part of the month, particularly on grain, showed very heavy shipments for this time of the year, although during the past few weeks the grain markets have been a trifle inactive and very few transactions can be reported.

Business in general is gradually improving in this district. There is a better demand for all classes of merchandise and prices are steadier. There is an improvement in building operations in the towns and manufacturing centers.

Stocks of dried and canned fruits are lower than those of a year ago.

LOS ANGELES

Building activity for March set a new high mark by overtopping the previous record of \$9,781,394 for permits issued last October, by more than \$1,000,000, making a total for March of \$10,964,829. With 4241 permits for the month and substantial increases in industrial structures the general situation was never more satisfactory. April permits to date indicate a likelihood that even the March figures will be eclipsed.

Bank clearings are continuing on an upward slant with cumulative averages for 1922 to date of between five and ten per cent. Savings accounts also maintain increases and are given as additional proof that buying tendencies are still backward with the single exception of the money being spent for housing.

Retail stores in electrical goods report a falling off of quantity sales as compared to same period last year. There is a marked tendency for the retail dealers to get together and do something big to stimulate a renewal of the normal volume of business.

Large sums of public funds are proposed for necessary additions to school

systems, water systems, and the troublesome problem of garbage disposal which has been repeatedly postponed. The total sums involved will be approximately \$35,000,000 for these three major problems.

Weather conditions are backward due to low temperatures but the effect is to postpone rather than damage the crops of fruits and vegetables.

PORTLAND

With mild weather, an improvement in retail trade is noted. Jobbing business is of about the usual volume for this time of year. The steadiness of most commodity prices is reflected in the more confident character of buying.

Lumber conditions, throughout the Pacific Northwest, have shown no material change. There has been some increase in the number of inquiries from the East, but storms and bad weather have had a tendency to prevent the placing of orders for building material. California business has continued slow, with a slight weakening in prices, although there are signs that buying in the northern and central parts of the state will start soon. Japanese purchases are light. It is expected that within 60 days there will be a shortage of lumber here, common as well as upper grades, with a corresponding improvement in prices, due to the building activities in the United States. Logging conditions are rather unsatisfactory. Many camps are still closed down for weather reasons, and the ruling prices show little profit to the loggers. Only about 60 per cent of the shingle mills in this section are now operating.

Wheat buying is restricted to milling grades, as the export inquiry at present is not important. The small proportion of the crop remaining in farmers' hands is strongly held.

Wool shearing in the earlier sections has been delayed by rains. No further attempts have been made by the dealers to buy the new clip on contract, because of the uncertain market conditions in the East.

SEATTLE

Inclement and uncertain weather for the past month has retarded activities in many lines of business, particularly in new building. New construction totaling in an aggregate sum more than a million dollars, has been outlined during the month, and building permits granted. However, active construction has been held off, but is scheduled to proceed during April and to be rushed from that time until completion. Included in the projects are two large office buildings, several large apartments, and a large number of resi-

dences. Home-building has been active throughout the city since the first of the year.

Public work, particularly highway construction, is well under way. That conditions in highway construction have practically reached normal is indicated by new road contracts let during March by the State Highway Commission. Paving contracts were awarded on bids from 10 per cent to 15 per cent below estimates. There were more and lower bids than during the month previous, and this condition, with regard to road work costs, is noted in all sections of the Northwest.

The lumber industry in the Pacific Northwest is showing a steady and encouraging improvement, particularly during the past 30 days. No advance in prices is predicted in the near future, although this move is almost imperative if the North Coast mills are to meet the competition of the southern pine mills in the common markets. On the whole, however, Northwest lumber manufacturers feel encouraged over recent developments, and are taking steps to prepare their mills for a good spring season.

The unemployment situation in the Puget Sound district is rapidly improving, and during the last two weeks a marked increase in the demand for workers has been noted. The lumber mills, cannery ships, fish canneries in Alaska, logging camps, highway contractors and the Skagit project are all calling for their quota of men, and as a result, the employment problem is solving itself.

SPOKANE

There has been some improvement in the condition of winter wheat in this district, according to the recent report of the United States Department of Agriculture. The general condition is reported as being 85 per cent of normal as compared with 79 per cent on December 1, 1921 and 100 per cent a year ago. Although the weather has been favorable, spring has been rather late, with the snow melting slowly.

Inquiries from the Middle West, which is the principal buying market for lumber from the inland mills of this section are increasing and the general outlook is encouraging.

Activity in the mining districts adjacent to Spokane is increasing and with the seasonal increase in agricultural activities, unemployment is expected to be materially reduced.

With the advent of good weather, collections, which were slow in March, are expected to show a distinct improvement, and business prospects for April are looked upon as brighter.

Volumes of sales are increasing slowly but surely in many lines.

DENVER

Disregarding the effect produced by the coal strike, conditions throughout Colorado are improving materially. Considerable activity is reported in both the agricultural and mining regions, while in Denver there has been a marked pick-up in most lines of business.

New building, mostly smaller dwellings started in March, resulted in the issuance of the largest number of permits for any period in twelve years. Permits in the number of 650 were issued representing a construction value of \$1,573,450.

This has improved the problem of unemployment although there is still an over-supply of unskilled labor. Wage scales remain the same and even with a stiffening in the price of building materials, reports indicate a healthy continuance during the spring and summer season.

Automobiles are moving faster, possibly due to the recent successful automotive show. Interest in new wearing apparel has been stimulated by a spring fashion show in which most of the down-town merchants participated. With the showing of the Electrical Home here this month, a demand for appliances and better housewiring jobs is anticipated.

Bank clearings are on the increase and with a marked decrease in the number of failures Federal Reserve bank officials look for a steady improvement. Local manufacturers and jobbers who are making new business for themselves have lost their pessimism of the past few months.

SALT LAKE CITY

The most important feature in industrial circles is the increased activity in mining, particularly in the Bingham district. While the Utah Copper Company has not actually resumed its work where it left off a year ago, this company is said to be employing approximately 350 men on its railroad and around its mills and mine, in preparation for resumption of copper mining operations. The Utah Apex, and other lead-silver properties in Bingham are placing several hundred men on their payrolls, which means that the date of resumption of their operations is not far away. In fact, the Utah-Apex Mining Company has actually resumed operations.

The unemployment situation is also being considerably relieved by the starting of public improvements, some of which are now well under way. Salt Lake City has \$425,000.00 worth of such work now in progress and expects to increase this by \$250,000.00 in the immediate future. A large amount of road work is also contemplated, and will be under way within a short time.

Bank deposits have shown a considerable increase during the past month.

Higher prices for farm products have been a source of considerable encouragement for the farmers. The wool market shows prices from 50 to 100 per cent better than those prevailing last year. Wheat has gained nearly 20 cents a bushel during the past few weeks.

Consumer Ownership Idea Shows Rapid Growth

Reports of Three California Utilities Indicate Increasing Demand For Power Company Securities and Stocks

Since its inception in June, 1914, by the Pacific Gas and Electric Company, the direct sale of public utility securities to consumers and employees has grown to a status where it is now one of the most important of the public utility company policies, not only in California and other sections of the West, but in the entire United States. While the activity has been national in its scope, California undoubtedly holds the lead in the development of the "consumer ownership" or "public-partnership" idea, as a review of the activities of three of the major public utility companies in that state will indicate.

Pacific Gas & Electric Company

During the year 1914, this company sold directly \$8,801,000 worth of preferred and common stock, the number of sales totaling 3739. During the period from 1914 to January 31, 1922, a total of \$26,413,700 worth of these securities were disposed of among 17,575 individuals. In this connection it is interesting to note that the selling cost of these securities was but 89 cents a share, including advertising, printing, paper, postage, salaries and commissions of the stock sales department. In the interval from July, 1920 to November, 1921 this average had further decreased to 71 cents per share.

There are 49,036 holders of this company's securities at the present time, and of this total, 32,622 reside in the state of California. Of the \$74,868,700 par value of the company's preferred and common stock outstanding at the close of 1921, \$49,112,900 or 65.6 per cent was held in California.

It might further be noted that the holdings of each individual averages slightly less than \$3800. Regarding the distribution of the common and preferred stock, there were 18,814 shareholders of this type on the company's books at the close of 1921. Approximately fifty-two per cent of this number held ten shares or less, thirty per cent held more than ten but less than fifty shares, twelve per cent held between forty-nine and one hundred shares and only sixty-three stockholders owned more than 1000 shares.

Southern California Edison Company

Stock selling activities of the Southern California Edison Company, as indicated by the number of dividend checks sent out to its consumer-stockholders on February 15, 1922, points to the fact that it is in advance of all other electric utility companies in the country in associating its patrons in its business. Statistics compiled by Vice-President A. N. Kemp, in charge of the company's financing, shows that the Southern California Edison Company has twenty-five thousand stockholders residing in the ten counties of southern and central California, in which it supplies electric service, as against two thousand stockholders residing outside of the radius of its operations.

This condition is the result of the company's aggressive campaign for

new stockholders carried on in 1921, whereby the number of stockholders was increased from 7,169 to 26,889 or by 370 per cent.

The company has 20,789 consumer-stockholders in its twenty-eight districts, in addition to approximately 4100 employee stockholders, bringing the total stockholders residing in the territory served by the company to 24,889. Only approximately 2000 shareholders in the company reside outside of the territory which it serves. The total number of dividend checks mailed on February 15th to resident and outside stockholders was 26,889.

On February 1, the company began limiting the amount of stock to be purchased by any subscriber to twenty shares. It fixed the amount of stock to be sold during 1922 at 75,000 shares, and judging by the present demand, it would all be disposed of in a short time, if the limitation as to the amount sold to one person had not been made. The idea of limiting the sales was to make the stock available to the greatest number of people. There was a big demand for the company's stock in the eastern market and through the country at large, but the heavy local sales to consumers preclude large blocks being taken outside of the territory which the company serves. The effect has been of adding twenty California stockholders to every one in the East.

In commenting upon this unusual record for stock sales, Vice-President Kemp made the following statement:

"Care has been taken to maintain the business of the corporation in such a manner that it would win the confidence of the public. We have always been conservative in our financing, paid special attention to the service given the people—in other words, have been a servant 'of the people, by the people' in every sense of the word."

San Joaquin Light and Power Corporation

The number of stockholders of the San Joaquin Light and Power Corporation increased gradually from a nucleus of 33 in 1911 to 2878 in March, 1922. The total number was 285 in 1912 and 519 in 1919 when the consumer-ownership campaign started. In a short time this number jumped to 1759 in 1920, and to 2086 in 1921.

On December 31, 1919, of the total of 519 stockholders, 376 resided in California and 152 outside the boundaries of the state. The California stockholders held 149,457 shares, of a total of 175,000 shares outstanding. On December 31, 1920, the number of outstanding shares had increased to 186,529, of which 159,728 were held by Californians, who numbered 1245. The group outside of the state, numbering 174, held 26,800 shares. On December 1, 1921, there were 193,559 shares outstanding, of which 165,827 shares were owned by 1769 California stockholders. The remaining 27,731 shares were held by residents of other states who totaled 177.

Arthur H. Crowell, who for seven years has been one of the road salesmen of the Washington Electric Supply Company of Spokane, has resigned and joined the Arthur-Fowler Company and will devote his time to that company's line of electric water heaters and accessories.

S. F. Bodler of San Francisco has been appointed western representative for Keystone radio lightning arresters which are manufactured by the Electric Service Supply Company of Philadelphia.

The Robbins and Myers Company, Springfield, Ohio, has placed on the market a small electrically operated air compressor for use in garages, tire repair shops and similar places. The machine was developed by the Au-to Compressor Company of Wilmington, Del., and will operate on 110 and 220-volt alternating circuits and on 32, 110 and 220-volt direct current circuits.

The Duplex Lighting Works of the General Electric Company has perfected a new residential Duplexalite and at the same time announced several changes and improvements in the standard line of these fixtures. The Duplexalite sales policy has been modified so that but one special agent will be appointed to represent this line in each community.

The Westinghouse Electric and Manufacturing Company is emphasizing modern methods of street lighting in an educational campaign for the installation of ornamental lighting systems by municipalities. Persons and organizations interested in the beauty, safety and progress of their respective cities are being circularized and literature is being sent to the officials of every city of over 1000 population.

The Prewitt Electric Company of Los Angeles has been awarded the contract for all of the electrical work on the factory of the Globe A-1 Ice Cream Company. Many novel features of electric control will be incorporated in the new plant.

The Elwell Parker Electric Company, Cleveland, manufacturers of electric industrial tractors and trucks, has perfected an electric truck with a carrying capacity of 3000 pounds equipped with a revolving counterbalanced crane. The machine was perfected for stacking heavy materials in shops, warehouses and yards. A single battery furnishes the power to drive the truck and to operate the crane.

Martin and Walker, contractor-dealers of Fullerton, California, have been awarded the contract for the electrical installation in the building which is to be constructed by the Fullerton Community Hotel Company.

The Cote Brothers Manufacturing Corporation, Chicago, has issued a folder, "Simplicity Fuses," describing the new refillable fuse of that name.

The Cutler-Hammer Manufacturing Company, Milwaukee, has put out a complete electric appliance cord having three important innovations. One of these is a spring coiler which prevents the cord from dragging, another is a 70-50 switch for convenient control of the current, while the third is a new steel clad cap to prevent breaking of the attachment plug.

The Rutenber Electric Company, of Marion, Ohio, manufacturers of "Mari-

Manufacturer, Dealer, and Jobber Activities

on" electric appliances, has perfected a dealer help in the form of a special window display to be used in conjunction with a national advertising campaign which the company is instituting.

The Edison Electric Appliance Company, Chicago, announces that two new Hotpoint Hughes electric ranges have been placed on the market, both incorporating many improvements. Both are automatic, one involving temperature alone while the second is practically self-regulating, maintaining the correct cooking temperature for any length of time.

The Ramsey Sign Company, of Portland, has just completed a \$25,000 electric sign for the Portland Flouring Mills Company.

The Illuminating Engineering Society has recommended the term "luminaire" for those types of lighting fixtures which can be moved from place to place and which have formerly been known as "movable fixtures."

C. H. Wellington is reported to have opened a new electrical supply store at Ventura, California.

The Home Electrical Specialty Company has been organized at Long Beach, California, and will shortly open a new store at 240 East Broadway Street, where it will carry a full line of electrical supplies.

The Edison Lamp Works of the General Electric Company has recently issued four bulletins under the general title of lighting data. The bulletins cover the following subjects: "The Edison Mazda Lamp for Motion Picture Projection," "Residence Lighting," "Church Lighting" and "The Lighting of Public Buildings."

H. H. Walker, of Los Angeles, was recently awarded the contract for a large installation of ornamental lighting in the city of Montebello. The installation was planned by the Engineer-

ing Service Company and will provide the Whittier Boulevard with an adequate system which has been very badly needed for some time. This is one of the heaviest traveled sections of the state's highways and the night trucking and auto traffic has grown to such extent that for safety to pedestrians and vehicles this installation is to be made.

L. R. Handley of El Paso, Texas, has recently joined the selling organization of the Los Angeles branch of the Illinois Electric Company. Mr. Handley was sales manager for the Mine and Smelter Supply Company for several years and has a wide circle of friends throughout the Southwest.

Reiman Wholesale Electric Company of Los Angeles has recently added an extensive line of lighting fixtures and glassware. This line has been installed in a very attractive display room on the ground floor in the space formerly occupied by their general offices, which have now been moved to the second floor.

H. W. Young, president of the Delta-Star Electric Company of Chicago, has been spending the winter in California making his headquarters with his mother who lives in Hollywood. Mr. Young is getting the California habit, this being the second winter he has spent on the Coast.

Clapp & LaMoree, engineering and sales representatives in Los Angeles, have moved their general offices to a ground floor location at 310 East Fourth Street, Los Angeles, where they will combine their warehouse with their offices thus giving them much larger ground area as well as facilities for rapidly handling orders for a number of eastern manufacturers whom they represent.

The Westinghouse Electric and Manufacturing Company, East Pittsburgh, announces the type "F-11" line of oil circuit breakers. These are moderate capacity indoor breakers, manually operated, non-automatic and automatic, with one, two or three trip coils. A 200-ampere, 4500-volt, and 400-ampere, 2500-volt breaker is made in two and three poles, single and double throw.



THIS MIGHT BE HOLLAND

However a glimpse at the table sets one's mind to rest. It is Denver and the men comprise the advisory committee of the Denver Electrical Cooperative League, one of the West's most progressive organizations of this type. In naming the gentlemen we ought to give their business titles but there are two reasons why it cannot be done. First, such a procedure would take up too much space. Secondly, our Denver correspondent did not send them along with the picture. Anyway, the group reads something like this: Sitting (left to right), N. R. Crooks; E. C. Headrick, the present chairman; F. F. McCammon, recently elected vice-chairman; H. W. Dye; H. D. Randall; T. O. Kennedy, former chairman; Alex Hibbard; O. S. More; John J. Cooper, secretary and treasurer; R. W. Elliott and J. W. Ryall. Standing (left to right), George Lewis, newly appointed manager of the Rocky Mountain Committee on Public Utility Information; J. P. Sprunt, Jr.; S. W. Bishop, executive manager of the League, and J. C. Davidson.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

WALLOWA, ORE.—An election to vote bonds in the sum of \$47,500 for a new high school building here carried by 71 to 5.

SALEM, ORE.—Construction of the plant of the Capital Ice and Cold Storage Company at an estimated cost of \$75,000 will start at once, it is announced.

SPOKANE, WASH.—Plans for the erection of a power house and factory building costing a total of about \$75,000 are announced by D. C. Hedlund of the Hedlund Box and Lumber Company, operating a sawmill, box factory and planing mill at Spokane.

CENTRALIA, WASH.—Plans for a Masonic building to be located at the southeast corner of Pearl and Magnolia streets have been announced. The building will contain three stories and is estimated to cost \$70,000. Construction will begin May 1st.

SNOHOMISH, WASH.—The Fruit Beverage and Canning Company plans to expend approximately \$50,000 in the next few months in building and machinery which will serve as an addition to the plants now operated by the company. This concern was established by F. B. Bowen, president, less than three years ago.

PORTLAND, ORE.—General plans for a proposed \$250,000 toll bridge to be built across the Pend Oreille river at Newport, Wash., have been completed by the Union Bridge Co. of Portland and Seattle, and the Seattle office of the U. S. Engineering Department, in charge of Colonel Schulz, has recommended that they be approved by the department in Washington, D. C.

PORTLAND, ORE.—The Young-McDonald Company, of Portland, expect to start pouring concrete for the piers for the Oregon short abutment of the Bridge of the Gods, to be constructed across the Columbia River just below the Cascade Locks, according to announcement recently made by R. R. Clark, the engineer who designed the bridge. The piers on the Oregon side are to be completed by June 5.

HOQUIAM, WASH.—An additional steam plant for the Grays Harbor Railway and Light Co. is planned, to be in running order within seven months, according to announcement recently made by E. N. Sanderson, president of the Federal Power Company, and the Sanderson & Porter interests of New York, owners of the property here. The improvement will represent an investment of \$250,000.

MEDFORD, ORE.—What is said to have been one of the first free and open bidding contests for irrigation work in the state of Oregon for many years was held in Talent, in Jackson county, recently, when the contract for building the Talent irrigation district dam was awarded, to D. M. Stevenson of Portland for \$78,595 and the contract for the construction of the 18.3 miles of canal to William Vonder Hellen, of Eagle Point, for \$67,444.

PORTLAND, ORE.—Plans for the factory of the recently organized Columbia Tire Corporation, to be erected on an eight-acre site in the Kenton district, have been prepared and it is the intention to begin construction work before the end of the month, according to the announcement of officials of the concern. The plant, which will be of reinforced concrete construction,

will cost \$80,000 and machinery and installations will cost an additional \$135,000, making a total of \$215,000. Officers of the concern are R. A. Wurzburg, president; A. A. Aya, vice-president; Louis Wyman, treasurer, and K. C. Warner, secretary.

SELLWOOD, ORE.—For almost three months work has been in progress at the plant of the Oregon Door Company, at the foot of Spokane avenue, Sellwood, on additions to the buildings and the placing of new equipment to be driven by electric motive power. Eventually the entire plant is to be electrified. New sections have been added to the buildings on all sides, some one-story and some two-story, and included in the new electrically-driven equipment is a moulder and a double-drum sander by which 1500 doors can be sanded a day. The outlay on the new additions to the buildings, the equipment and installation, is approximately \$100,000.

THE PACIFIC CENTRAL DISTRICT

OAKLAND, CAL.—The Universal Products Company, manufacturers of household products, is to erect a factory here to cost approximately \$100,000.

RICHMOND, CAL.—The board of education in Richmond will open bids on April 26 for the construction of the Roosevelt Junior high school, which will cost \$200,000, and for the Nystrom grammar school to cost \$25,000.

SAN FRANCISCO, CAL.—A ten-story and basement Class A apartment building is being erected on the southeast corner of Geary and Shannon streets by M. A. Little, owner. Edward E. Young, 251 Kearny street, is the architect. Estimated cost, \$250,000.

PITTSBURG, CAL.—The California Bean Growers' Association has purchased four acres of waterfront here and will erect thereon the first unit of a warehouse and packing and shipping depot to cost \$100,000. The entire building as proposed will cost \$500,000 when completed.

SANTA ROSA, CAL.—R. Press Smith, county engineer, is proceeding with the plans for several steel bridges on the county road system. The contract for the Russian River bridge at Guerneville has been awarded to Mercer-Fraser Company of Eureka for the sum of \$95,400 complete.

BAKERSFIELD, CAL.—The Henry Cowell Lime and Cement Company contemplates the erection of a cement plant in Kern county near Tehachapi. The ground for the plant has been purchased and the plant is expected to be in operation within six months. The cost is estimated at \$3,000,000.

AUBURN, CAL.—Applications filed this week with the state division of Water Rights by Assemblyman Ivan H. Parker of this city indicate plans for a \$562,000 dam on Bear River, nine miles northeast of here, and for canals to carry water to land in western Placer and eastern Sutter counties.

SAN FRANCISCO, CAL.—A five-story and basement Class B building will be erected by the Bothin Real Estate Co., owners, at the northwest corner of Howard and First streets, to be used by printers and allied trades. Estimated cost, \$110,000. Cahill Bros., 110 Sutter street, contractors; Arthur S. Bugbee is the architect.

SACRAMENTO, CAL.—Bids for two more units of the \$250,000 repair plant of the California state highway commission, which is being built here, will be advertised for within the next fifteen days. The first unit of the plant has been completed at a cost of \$75,000 and a second unit is under construction.

SAN JOSE, CAL.—Plans are being prepared by the engineering department of the California Prune and Apricot Growers, Market and San Antonio streets, San Jose, for a one and one-half story steel frame reinforced concrete or hollow tile packing plant building to be erected in Cooper's Second Extension in Colusa. The estimated cost of the structure is \$125,000.

THE INTERMOUNTAIN DISTRICT

AGUILAR, COLO.—The Aguilar Light and Power Company has recently purchased a site for a new building to be erected at an early date.

LAMAR, COLO.—The McCue Mercantile Company of this city submitted the low bid of \$31,216 for the erection of the new state armory here.

LAMAR, COLO.—The Nazarine Church is completing plans for the erection of a church building at the corner of Poplar and North Sixth streets.

DENVER, COLO.—A \$700,000 five-story building will be started next May at a site near 20th and Larimer streets, according to City Chaplain Goodheart.

COLORADO SPRINGS, COLO.—L. T. Rickerson announces that a \$100,000 apartment house will be erected at the corner of Plattee and Cascade avenues.

COLORADO SPRINGS, COLO.—The Colorado Springs and Interurban Railroad will erect a \$50,000 drug store building and waiting room at its Manitou terminal.

LITTLETON, COLO.—Actual construction of a new hotel and theater building east of the Hotel Littleton will be started within the next month by Mrs. A. Ritter.

GREELEY, COLO.—The Colorado Milling and Elevator Company will erect a flour mill here this summer, according to recent announcement by H. E. Kelly, district manager.

FORT COLLINS, COLO.—Poudre Valley Camp No. 50, Woodmen of the World, plans the erection of a two-story lodge building at an early date. Estimated cost is \$35,000.

BOULDER, COLO.—Plans for three new school buildings to be erected here have been completed by Architect A. E. Saunders and submitted to the school board for approval.

DENVER, COLO.—Edwin Scorb, Roger W. Taggart, Clay Munson, G. B. Suter and Henry Sebolt have incorporated the National Electric Service Corporation and will establish a factory here.

BUTTE, MONT.—The Masonic Temple Association has decided to build additional quarters which will add 180 per cent to the area of their present building. The structure is estimated to cost approximately \$250,000.

COLORADO SPRINGS, COLO.—Bids will be asked at an early date for the memorial auditorium at the Modern Woodmen sanatorium, according to Chas. E. Thomas, local architect, who will be in charge of construction.

COLORADO SPRINGS, COLO.—John Collins is planning the erection of a \$25,000 apartment house to be erected in the 200 block, East Colorado Avenue.

CASTLE ROCK, COLO.—The city council is asking for new bids for construction of the local electric light plant. The original set of bids received last December have been rejected.

DENVER, COLO.—Announcement has been made of the early construction of a ten-story office building as a memorial to the late Thomas M. Patterson, at a cost of \$500,000, by Lovejoy and Frewen, local architects.

COLORADO SPRINGS, COLO.—Frank O. Ray, city engineer, has been instructed to prepare estimates of costs for a new storm sewer for the west side of town. The project will cost in the neighborhood of \$50,000.

ESTES PARK, COLO.—The Estes Park bank will erect a two-story bank and office building in the near future. Plans are also being prepared by the Rocky Mountain Parks Transportation Company for a two-story office building.

DENVER, COLO.—Extensive additions to the ornamental street lighting of the city will be made in the letting of contracts for new units to be used on the Broadway extension and several of the streets in the lower part of the city, at a cost of about \$100,000. The city engineer's office is working out the details.

BILLINGS, MONT.—Alvin C. Leighton, who is head of the enterprise which has for its object the construction of a dam across the Yellowstone river and a hydroelectric plant at Buffalo rapids, has made plans for the dam and a power house with 8 horizontal turbines, which will give the plant a capacity of 27,000 hp. during high water.

COLORADO SPRINGS, COLO.—Announcement has been made by Mrs. Isabelle C. Argo, of the Colorado School for the Deaf and Blind, that bids will be advertised for shortly for construction of a new dining hall at the school. Plans are also being discussed for a \$175,000 addition to the Glockner Sanatorium, to be made this year.

ENGLEWOOD, COLO.—The General Iron Works Company, representing the Consolidated Foundry and Iron Works interests of Colorado, has purchased eighteen acres adjoining the Denver county line on which a plant costing \$750,000 will be constructed early in the summer. T. B. Stearns of the Stearns-Rogers Manufacturing Company is directing the developments in the organization.

SALT LAKE CITY, UTAH.—Plans for the Lafayette school building have been approved by the board of education and bids will be advertised for as soon as working drawings have been completed by the architect, Raymond J. Ashton. The school will cost \$187,000 completed, will be three stories in height and built in a U-shape, of reinforced concrete, brick and terra cotta construction, the latter being used for decorative purposes.

THE PACIFIC SOUTHWEST

SAN PEDRO, CAL.—The Methodist Episcopal Church will erect a new church building here to cost approximately \$85,000.

PHOENIX, ARIZ.—Bids are being received for \$100,000 worth of structural steel for the \$500,000 Elks' Building here.

LOS ANGELES, CAL.—The contract for the construction of the Second Street tunnel has been taken over by James K. Hill, contractor.

LONG BEACH, CAL.—National Axle Corporation will erect a \$75,000 factory building on a lot just south of the Golden State Woolen Mills.

LOS ANGELES, CAL.—Work will start at once on the erection of a \$400,000 plant for the Globe Ice Cream Co. at Jefferson and Hill streets.

SAN DIEGO, CAL.—A substation, to cost approximately \$200,000, will be erected by the San Diego Consolidated Gas & Electric Co. at 4th and Ash streets.

TUCSON, ARIZ.—A three-story and basement high school will be erected here to cost between \$50,000 and \$100,000. Lyman and Place are the architects. A site has not as yet been selected.

LONG BEACH, CAL.—The Union Pacific Ry. Co. has commenced the delivery of material for the freight terminals and fireproof freight house which will be erected at W. First and Ontario streets.

LOS ANGELES, CAL.—Alterations and additions to the office building of the Southern California Telephone Co. will cost approximately \$70,000. Meymouth Crowell Co. are the contractors.

BURBANK, CAL.—Local parties have organized the Burbank Ice and Cold Storage Company and will expend \$30,000 on a plant and machinery, to be erected at 1st street and Angeleno.

NATIONAL CITY, CAL.—The Jet Oil Company of this city has completed its arrangements for a site on which to build an oil refinery. The first unit will be for lubricating oils and will cost \$50,000.

ATASCADERO, CAL.—W. E. Higman and H. B. Mason plan to erect an ice and cold storage plant to cost approximately \$200,000. The building will be 200 by 100 ft. including storage space, compressor room, and tank room.

SANTA MONICA, CAL.—Palisades Park is to have a modern ornamental lighting system, according to plans determined by the city council at the last meeting. Special tests will be conducted to decide the units most effective.

LONG BEACH, CAL.—Dow Construction Company was low bidder for the 10-story apartment house for Omar Hubbard, according to plans prepared by John and Donald Parkinson, of Los Angeles. The contract amounted to \$320,000.

ALBUQUERQUE, N. M.—Albuquerque Gas & Electric Co.'s plant will be improved at a cost of \$200,000. The improvements include a new water treating plant, new turbine pump and installation of power plant efficiency instruments.

LOS ANGELES, CAL.—The Clinton Construction Company was awarded the contract for a 10-story office building to be erected for the San Joaquin Valley Hotel Corporation. The contract price was \$331,755. Loy L. Smith is architect.

SAN DIEGO, CAL.—J. W. Sefton will erect a 10-story office and bank building on C street between 4th and 5th streets. It is announced that the ground floor will be occupied by the San Diego Savings Bank. G. Edward Chase, engineer, is preparing the plans.

LONG BEACH, CAL.—The Pasadena Furniture Company will erect a 5-story Class A store and warehouse near its present location on American Avenue. According to the announcement of R. R. Hatfield, local manager, the work will be started in the near future.

LOS ANGELES, CAL.—The Hartford Wind Shield Co., manufacturers of automobile accessories, has recently acquired a lot on Los Angeles street, between 16th and 17th, where a two-story building will be erected in the near future. The building will cover the entire area of the lot.

BAKERSFIELD, CAL.—An ice manufacturing and loading plant, to be erected in the Southern Pacific railroad yards here, was announced recently by officials of the Southern Pacific Company and the Pacific Fruit Express. The structure will be completed in time for the fruit train traffic of this season.

ORANGE, CAL.—\$250,000 will be expended for a storage dam in Santiago Creek to be used jointly by the Serrano Water Company, the

John T. Carpenter Company and the Irvine Company. The structure will be 90 feet in height and vary from 300 ft. in width at the base, to 600 ft. at the top.

SAN LUIS OBISPO, CAL.—The Tripoli Hotel Company plans the erection of a large group of hotel and store buildings, and has commissioned architects George W. Eldredge and Thomas Jewell of Los Angeles to prepare plans. Full accommodations for 175 guest rooms, and 6 stores are to be included.

PASADENA, CAL.—Bids have been received by the city clerk for the underground conduit system to be installed on Grand Avenue between Colorado and California streets. Fibre conduits, five duct section, together with manholes and transformer vaults, and 188 iron pipe laterals are included in the specifications.

LOS ANGELES, CAL.—The Pacific Electric Company has completed the preliminary plans for the proposed tunnel system for the Hollywood and Glendale lines and has petitioned the state commission for permission to commence construction. The tunnel will be 1.5 miles in length and will cost \$1,850,000.

LOS ANGELES, CAL.—Articles of incorporation have been filed by the California Electric Heating Co., with a capital stock of \$400,000. The directors are W. H. Vance, F. B. Ranger, Shane Morgan, John W. Kemp and M. B. Silverberg, all of Los Angeles. Attorneys are Kemp, Mitchell & Silberberg, Marsh-Strong Building.

PHOENIX, ARIZ.—Dr. W. C. Ellis will start at once on the erection of a four-story office building, the work to be done by the Malwaukee Building Company of Los Angeles. Dr. Ellis also contemplates building a six-store business block on the former site of the Methodist Church, South. The church building will be torn down at once to make way for the new buildings.

INGLEWOOD, CAL.—The American Enameling and Stamping Company of Los Angeles has been reorganized under the name of Smoot-Holman Company. A 5-acre plot of ground has been secured in this city where the company plans the erection of a modern plant immediately. All kinds of stamped and spun enameled ware are to be made by the company, in addition to special work according to specifications of purchaser.

LOS ANGELES, CAL.—Westinghouse Electric and Manufacturing Company has awarded the contract for its new warehouse to Earl B. Newcomb on a percentage basis. According to the announcements of Noerenberg and Johnson, architects, the 8-story structure will be equipped with the most modern and complete freight and package handling devices, 8 freight elevators and 5 traveling cranes being included in the specifications. The cost is estimated at \$700,000 for the first unit.

LOS ANGELES, CAL.—Schofield Engineering Construction Company were low bidders at \$154,000 for the Class A building on Flower street for the Central Business Properties Company. The contract for the interior trim amounted to \$125,000 additional. The building is to be occupied by a high-class catering establishment and the equipment includes dumb waiters, refrigerating system, and special heating and ventilating systems. Stanton, Reed and Hibbard are the architects.

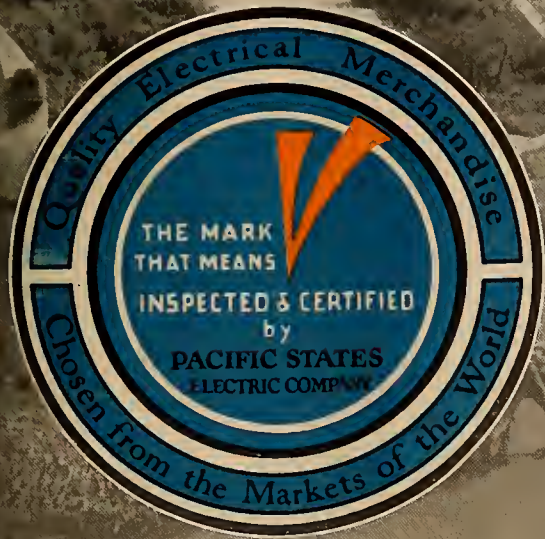
LOS ANGELES, CAL.—Plans for the immediate construction of an electric substation for distribution of power to the entire harbor district have been completed. The substation will be erected at Harbor Boulevard and Regan St. and will cost approximately \$150,000. Dynamos and other electrical equipment are estimated to cost \$150,000 additional. Charles C. Couteault is in charge of the city water department's San Pedro office. This department has also taken over the management of the Southern California Edison Company's lines and equipment.

Journal of Electricity and Western Industry

25 Cents a Copy

May 1, 1922

San Francisco



EACH DAY marks more widespread building activity throughout the Pacific Coast Territory. And each day finds an increasing number of the electrical installations being made by "Check" Seal Contractors with "Check" Seal materials.

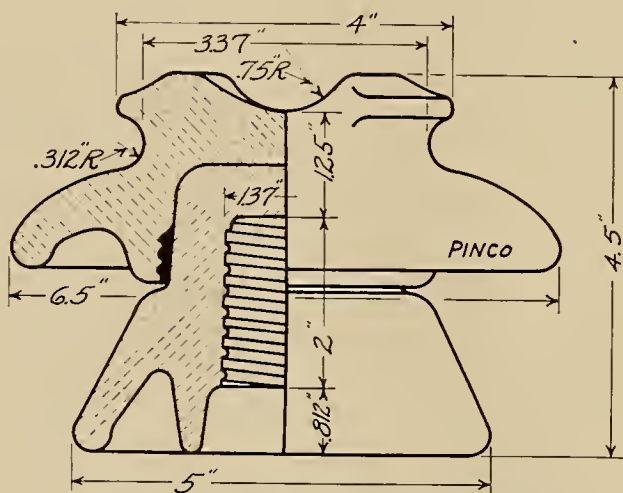
PACIFIC STATES ELECTRIC COMPANY



P I N C O

"The Correct Design"

Pin Type and Strain Insulators



No. 66—line rating 25,000 Volt

The quality standard of discriminating engineers.
Pin types in line ratings up to and including 90,000 volt.

Send for Descriptive Bulletins

Pacific Coast Distributors

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

ROBERT SIBLEY, Editor

A McGraw-Hill Publication

Founded 1887

C. M. LINDSAY, Bus. Mgr.

VOLUME 48

SAN FRANCISCO, MAY 1, 1922

NUMBER 9

A semi-monthly chronicle of western events, advocating the economy, efficiency and convenience of electric power for all industries of the West—manufacturing, agricultural, mining, merchandising, home building and home making. Interpreting the value of electrical development to the business and financial man, the industrial man, the power man, wholesaler and retailer, contractor and constructor, engineer and home owner.

Because of the abundance of water power in the West susceptible of economical development, a dependable, uninterrupted supply of cheaper electric power is assured for these industries. The basic industry of the West—hydroelectric power generation—for which Journal of Electricity and Western Industry is the spokesman, is therefore logically and inseparably linked to the growth and prosperity of all phases of our daily life and business.

Copyright, 1922, by McGraw-Hill Company of California. Subscription Rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulation.

Printed in U. S. A.

The McGraw-Hill Company, Inc., of New York, parent company to McGraw-Hill Company of California, are also publishers of

Engineering News Record

American Machinist

Power

Chemical and Metallurgical Engineering

Coal Age

Engineering and Mining Journal-Press

Ingenieria Internacional

Bus Transportation

Electric Railway Journal

Electrical World

Electrical Merchandising

Journal of Electricity and Western Industry

(Published in San Francisco)

Electrical Review and Industrial Engineer

(Published in Chicago)

American Machinist—European Edition

(Published in London)

Pacific Mining News Supplement to

Engineering and Mining Journal-Press

(Published in San Francisco)

EASTERN OFFICES:

NEW YORK, Tenth Ave. at 36th St.
WASHINGTON, D. C., 610-611 Colorado Bldg.
CHICAGO, 1570 Old Colony Building.
PHILADELPHIA, Real Estate Trust Building.
ST. LOUIS, 713 Star Building.
CLEVELAND, Leader-News Building.

Editorials

335

Supporting a Competing Industry with Tax Money—The West Is Solving the Labor Problem—Why Not Develop a Western Iron Industry?—Public Relations in the Lumber Industry—The Problem of Condenser Tube Corrosion—Improvement in Radio Broadcasting—Business Cycle Study by Federated American Engineering Societies—The Association on Associations—The Public Sentiment Against Futuristic Landscape.

Applying Electricity Scientifically to Factory Problems 343

By LOUIS F. LEUREY

An example of what can be done in adapting electricity to the special needs of a factory as illustrated by the modern equipment of the California and Hawaiian Sugar plant.

Western Labor Relations on the Way to Sound Solution 346

By GEORGE L. BELL

The special advantages of the western labor situation, based on the willingness of the large employer to maintain his interest in bettering conditions during periods when no labor crisis forces concessions.

Controlling the Principal Artery of the Southwest States 348

By C. E. GRUNSKY

One of the foremost authorities on the Colorado River discusses the situation now before the Colorado River Commission in the light of the future industrial and agricultural possibilities of the Southwest.

Should California Reject the Principle of Utility Regulation? 351

By E. O. EDGERTON

The former president of the California State Railroad Commission defends the present system of regulated service which is endangered by the proposed Water and Power Act which is to be voted on in November.

Western Comment on Current Events 338

Letters to the Editor 340

Builders of the West—A. L. Mills 342

China is Electrical Machinery Market 347

Denver Proves Illumination Is Asset to Civic Beauty 353

Self Improvement in Salesmanship 354

Increasing Production in Industry 356

Western Dealer, Jobber and Agent 357

Activities of the West 360

Meetings of Interest to Western Men 365

Personals 366

Business Outlook in Western Market Centers 368

Manufacturer, Dealer and Jobber Activities 370

Construction News and Industrial Developments 371

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of CALIFORNIA, Rialto Building, San Francisco

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.

JANKEE
SWITCHES



BRYANT-PERKINS



PERKINS
SWITCHES

SPAR-TAP



2-Way Socket

Holds the lamp vertical.

Holds the shade properly.

Pull chain controls light.

Side outlet fits any Standard parallel-blade attachment plug.

Both outlets 660 watts, 250 volts.

Easy to Sell

Packed in four-color display carton—ten in a carton.

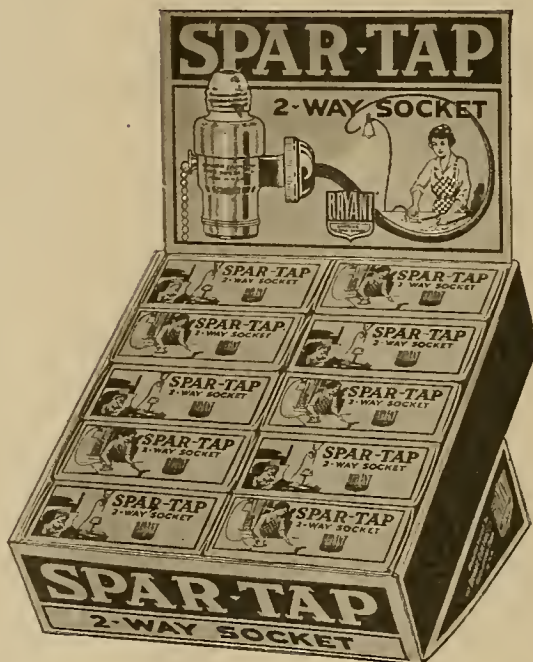
Open the carton and set it on the counter. When ten are sold, open another carton. No assortments, no dead stock. This is clean, live merchandise.

AV-33 Spar-tap Sockets

List price, \$1.00

Schedule B2—Standard Package 50—Carton 10.

Order from your distributor.



THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK

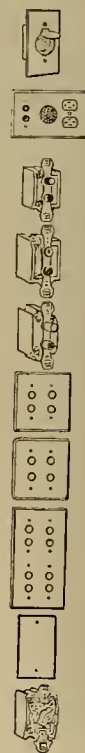
CHICAGO

SAN FRANCISCO

SPARTAN
RECEPTACLES



PERMA
FLUSH PLATES



D-D
RECEPTACLES



BRYANT-PERKINS



JUNIOR
RECEPTACLES

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 9

SAN FRANCISCO, MAY 1, 1922

Per Copy, 25 Cents

Supporting a Competing Industry With Tax Money

THE Water and Power Act, the proposed constitutional amendment to be voted upon by the people of California next November, contains provisions which make its defeat a matter of vital interest to every manufacturer in that state, since its passage would amount to the socialization of all industry. If passed, it would permit a politically appointed board of five men to engage in any business from growing peanuts to the operation of sawmills or drilling for oil. This unknown board with 500 million dollars of state bonds at its command, in addition to many other powers, would be specifically empowered to "acquire, produce, MANUFACTURE or otherwise provide facilities, materials and supplies, raw or finished, and any property, or anything necessary or convenient."

While the act is ostensibly created to allow this board, as a state agency, to go into the business of a water and irrigation company, and the business of a hydroelectric light and power company, it is permitted to go into any business that it thinks necessary.

This means not merely that the board might go into the business of providing cement or gravel, or power plant equipment, or manufacturing poles and electric appliances, but that under these provisions there would be nothing to stop it from manufacturing the cotton materials required in the households of its employees or from opening canneries or laundries to meet

their needs. Nor does the law provide that they shall not go farther and sell material to the public. There is nothing which could not be included under this clause. It is further provided that there could be no appeal from the edicts of the board. Those industries which the board did not wish to "acquire" could be ruined by competition. And all this would be part of the fundamental law of the state incorporated in the constitution and not to be changed except by the cumbersome processes of the popular vote.

In this connection it is well to remember that to the board is delegated the additional authority to appoint as many employees as it thinks necessary and to fix their compensation as it sees fit. It takes no stretch of the imagination to visualize the amazing political machine which could be developed within these limits.

There is no need for the state going into the water and power business in the first place, it being efficiently administered by private companies. Government may properly regulate industry, but it must not invade its field as a competitor or as a monopoly. The functions of the state are political—there is now too much government in business. Such a proposal to set aside the principles of American government and to place more complete authority in political hands as is incorporated in the Water and Power Act was never witnessed in soviet Russia or in North Dakota.

The West Is Solving the Labor Problem

LABOR unionism has a history which is made up of a succession of strikes, practically all of them lost. And yet the movement has gone steadily forward, on the whole gaining in strength. Labor is no more satisfied today than it was ten years ago—the solution to the labor problem, from the employer's standpoint, does not lie in winning strikes.

On another page of this issue appears an article by a specialist in "industrial relations" who sounds a note of optimism in regard to the western position between employer and employee. He makes plain the fact that in the end it is the individual employer who must solve his own problem—and that he must solve it by considering it seriously during periods free from industrial strife. It was Disraeli who said "War is never a remedy—it is an aggravation." The same might have been said of a strike, however it ends—all constructive work must be done in the intervals. The labor situation in the West, owing

to the few large industrial centers, and also to the friendlier relationship between workers, has never been as acute as in the East. The present tendency of western employers to study the problem and to grant concessions, of their own volition, during such periods as the present is a tremendous safeguard for the future and augurs well for the industrial prosperity of this district.

Why Not Develop a Western Iron Industry?

THERE are few industries on the Pacific Coast which suffer from the lack of an abundance of raw materials. There is, however, one major field which stands in that position, namely, the metal industry, whose greatest problem is to find in this western country good coking coal or to devise a commercially profitable means of refining iron ore without the use of coking coal. Throughout the West are great deposits of high grade iron ore easily available for mining and transportation. But nature

has not supplied one of the essential elements for refining—namely, good coking coal free from sulphur. The use of electric current and crude oil in this connection has not yet been worked out to full satisfaction.

A letter to the editor from an engineer with European experience appearing under this date, suggests that a similar problem has been met by Sweden with methods which might find application on the Pacific Coast. In that country the use of charcoal from lumber waste, combined with the use of electric furnaces has developed an industry of tremendous magnitude.

The whole matter is one of tremendous importance to the West—and one which should receive due attention in research. Owing to climatic conditions and other advantages of this region, it is possible to carry on the manufacture of all kinds of metal products under the most economical conditions, and with a cost of raw materials no higher than in the eastern centers, the West could undersell them in finished products. Is not the matter of such importance that the western states could afford to make definite appropriations to study the problem, probably through adequately supported research carried on by the mining and engineering departments of the state universities?

Public Relations in the Lumber Industry

THE lumber industry, no doubt in common with most other industries, has for some years been suffering from the fact that it is usually not understood by the public in general, and in particular not by certain representatives of the public in various governmental legislative and executive positions. This misunderstanding is due in part to the general agitation against corporations which is always in progress, conducted by one element of the soap-box press, and undoubtedly also in part to the recent recriminations and shiftings of the blame for the high cost of living indulged in between industries.

The public has the mistaken impression that the lumber industry has made and is making enormous profits through the wilful devastation of the forest resources of the country. There is an organized movement under way to force the industry through legislative action to manage its forest lands in a way to make them permanently productive. It has even been suggested that, along with coal and oil, the lumber industry should be placed in the class of public utilities regulated by the Federal Government.

While there is great need for the development of a sound forest policy in the United States, the burden cannot be placed entirely upon the industry. The public is largely responsible for the situation which exists and until it realizes that it has a number of duties in the matter and is ready to assume them, no equitable or permanent solution can be worked out. Present timber owners in the main will always stand ready to do what can reasonably be expected of them.

The timber of the United States is being cut several times faster than it is being replaced by growth; the situation is growing more acute and it will become more so in the future. Something will be done sooner or later to provide for a national forest policy. If the public is not thoroughly informed of the facts of the situation it is apt when it does move, to take decidedly unsound and unfair action. There is urgent need for sound public education.

The Problem of Condenser Tube Corrosion

WHILE a great deal of thought and attention is being given to the development of our hydro-electric resources, it must not be forgotten that steam power installation is still one of major proportions in the West. Take the case of California as an example. Even among our central stations, not to mention industrial plants, there is something like 500,000 horsepower in steam generating equipment as compared with 1,000,000 horsepower in hydro-electric equipment. Hence, the subject of increasing economy in the boiler room is still a matter of prime importance. Condenser tube corrosion in those steam plants that utilize salt circulating water in surface condensers is a problem of long standing, and yet the causes and remedies for this trouble are still little known. Much interesting research has been performed, and many theories have been advanced and remedies proposed, but in spite of the vast number of investigators who have labored on the question, it appears that the solution is not yet achieved. A new installation of tubes remains to a certain extent a gamble, and corrosion continues to be one of the most vexatious problems of the central station. Not only does this problem concern central stations, but all those who use surface condensers in industry generally, and it is to be hoped some definite research will be undertaken to meet this situation with sufficient impetus back of it to really see the problem through.

Improvement in Radio Broadcasting

BY far the most popular subject of conversation these days is "radio." Golf, business, prohibition, and the soldier's bonus have all taken back seats as far as conversational material is concerned, and even baseball, that monarch which received pages of publicity in former years, is being condensed in the newspapers to make room for radio news. Whether the sudden wave of popularity is transitory or not is problematical, but at the present time radio sets on the market are as scarce as the proverbial hen's teeth, and manufacturers have sufficient orders booked ahead to insure several months of capacity production.

Like all industries of mushroom growth there are many evils to be corrected before perfection is reached. Everyone who is familiar with the strides which have been made in radio transmission in the past year or two believes that the ultimate possibilities have not been attained. Of more immediate

interest to the average householder who has installed a set is the question of whether it will be of any use to him for other than a few days of amusement. As soon as the novelty of hearing "canned music" from the air wears off he is apt to return to the phonograph where he can make his own selections and be free from annoying interruptions. Provided he has not installed an amplifier or loud speaking attachment his family may also tire of sitting in a rapt and attentive circle, as they are almost always pictured in the advertisements, each with an individual receiver on his ears.

The efforts of the Pacific Radio Council and other bodies to restrict promiscuous sending and limit the wave length used by amateurs, as well as standardize the hours and improve the quality of concerts and other broadcasting activities will receive the hearty endorsement of all radio enthusiasts, which means almost everyone.

The Association on Associations

THERE has been for some time considerable criticism within the electrical industry of the avoidable duplication of effort in the activities of the industry's many associations. Now comes word that the Society for Electrical Development has made a move to eliminate the waste of time and resources by appointing a committee to request every other national association in the electrical industry to appoint representatives to serve on a joint committee to discuss and define the most constructive and logical fields of effort for each association, and effect an agreement which will eliminate overlapping of effort. It sounds rather complicated but is a move in the right direction, provided that the other associations will cooperate with the Society for Electrical Development in carrying out the proposed plan.

It is hoped that the move will be supported enthusiastically and in such a manner as to hasten action and results. Otherwise the committee may prove to be but another "association of associations" in the already overpopulated field.

Business Cycle Study by

Federated American Engineering Societies

NEWS that the Federated American Engineering Societies have started to accumulate data to show steps that have been taken by industry to smooth out the business cycle, will be followed with interest by business men in general. This request comes from Herbert Hoover, former president of the Federation, under whose leadership that illuminating volume, *Waste in Industry*, was compiled. Each member organization of the Federation will be asked to cover the industries in their locality, and a special committee of the Washington society has been appointed to take charge of the work in cooperation with the Federation.

Economists have long contended that in the disposition of surplus profits accumulated during prosperous times lies the solution of financial strength and credit in times of stress. The past few years

have witnessed a wider popular appreciation of economic laws than ever before. A fuller understanding of all the intricate relationships of production and distribution by the largest number of business men will produce the perspective essential to the ultimate smoothing of the business cycle.

The Federated American Engineering Societies hold that "Engineering is the science of controlling the forces and of utilizing the materials of nature for the benefit of man, and the art of organizing and directing human activities in connection therewith." The result of a survey by this able body cannot but add to the increasing knowledge of "business cycles, their cause and prevention," and will furnish an accurate index as to the extent which business and industry are seeking to eliminate periods of inflation and expansion and their inevitable aftermath of depression.

The Public Sentiment

Against Futuristic Landscape

JOHN SMITH, who represents the public, is the person to whom all advertising is addressed. To catch his fancy, street corner billboards blossom into multicolored frenzy and newspaper and magazine pages shout aloud the most arresting phrases the copy writer can devise. All of which, John, being a human sort of a chap and interested in what goes on about him, rather enjoys. At any rate, he lets it influence his conduct to the extent that it pays the manufacturer to spend much money in thus challenging his attention.

But there is a limit to all good things. John likes his Sunday ride—or walk (depending upon his pocket book and the age of his walking muscles)—and he has as good an eye for the beautiful in nature as the next man. Pick any westerner at random and ask him to talk about the beauty spots of his state. The extent of his vocabulary and the depth of his feeling will astonish you. We believe the present day advertiser underestimates this trait in the man he is endeavoring to please. John—and his wife Mary, too—kodak as they go, but the photograph of the family group against a background of apple blossoms is somewhat marred, to their thinking, by a signboard urging them to purchase winter underwear or eat pickles of a given make and quality. They take along their lunch as a rule, but even ham sandwiches taste much less sweet when eaten in the shade of a mammoth tire which never slips even in wet weather. It has gotten to the point now where an almost solid line of advice in billboard form flanks the principal highways of western states and there is no vista remaining which has not its word of counsel—nay, command—to the possible purchaser.

There is more feeling against the country billboard than most manufacturers realize. There has even been some talk among the more ardent nature lovers of boycotting manufacturers who desecrate favored beauty spots. In the end of course, the desire of the public will prevail. This is just a hint to those spending money for advertising as to one of the present tendencies of John Smith's opinion.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

After a number of hearings before the State Industrial Welfare Commission and much research and investigation into costs of living and budgets, the minimum wage for women and minors in certain industries in California has been reduced from sixteen to fifteen dollars per week. This reduction which will be effective on June 12th applies only to those employed in general manufactures, fruit and vegetable canning and packing, fish canning and unclassified industries. It does not apply to mercantile, laundry, hotel, restaurant or office workers.

Reduction of Minimum Wage in California

The California Manufacturers' Association, at whose request last November the investigation leading to the reduction was instituted, based its claim on the fact that there had been no reduction in minimum wages since the war, since which time costs of living had declined. It was also pointed out that in industries employing seasonal labor, largely unskilled, that wages were out of line with the selling price of the products.

It is natural that wage cuts should be opposed by laborers but the costs of labor are among those that have declined least in the general readjustment which must occur before normal business conditions can be resumed, and the minimum wage is only the lowest possible wage which may be paid. Skill and experience are entitled to recognition, and receive wages in proportion.

The Pacific Northwest, which has felt the business depression as keenly as any section of the western states, is showing unmistakable signs of recovery.

The effect of increased activity in building construction has had a salutary effect on the lumber market, the unemployment situation and on general business.

Northwest Cities Building Record Shows Increase

During March Seattle was among the eighteen cities in the country that made the greatest increase in building activity. Permits numbering 968 and valued at \$1,791,670 were issued; being an increase of ninety-four per cent in value compared with March, 1921.

It has been estimated that during the first week in April there were 2,500 residence buildings under construction in Portland, valued at \$7,500,000. During March 1,388 permits were issued valued at \$3,162,855, an increase of one hundred and seven per cent in value compared with March of last year.

The principal activity in both cities has been in new homes, rather than in office buildings, apartment

houses or large construction projects. In both centers there are a number of large business structures which are planned, but which, it is reported, will not be erected under the present unfavorable labor conditions. The principal bone of contention between prospective builders and contractors and building trades unions is the question of wages.

According to figures compiled by the Federal Reserve Bank of San Francisco, in twenty cities in the states embraced by the Twelfth District, there has been an increase of twenty-two per cent in number and seventy-six per cent in value of building permits issued in the first three months of 1922 compared with 1921. The total value of the permits issued in these cities during March, 1922, was the largest on record, totaling in excess of twenty-seven million dollars.

Recovery in western industry depends primarily upon increasing prices for the basic raw materials of commerce and a reduction in costs of distribution

The West and Its Relation to World Affairs

and manufacture of these materials. The manufacturing interests of the Pacific Coast are growing in importance, but the bulk of western activity—the lumber industry, mining, petroleum refining, fishing, meat packing, grain milling, and canning and packing of fruits and vegetables—belongs to the basic group of extractive industries whose efforts are directed toward placing a raw material upon the market in its primary form.

It is obvious, of course, that prices in this field depend to a large extent upon factors over which the West can have little control. Prices depend largely upon demand and, inasmuch as the principal products of this district have a world market, it is world demand which is controlling. No one district, not even the West, may effect a complete reform in such factors as currency stability, budget balancing and the cessation of political rainbow chasing. If these elements cannot be influenced locally, however, it may also be said that they are matters to which the entire world is giving its attention. The recent pronounced improvement in foreign exchange rates, probably the most sensitive barometer we have, is significant of the improvement abroad as is the curve of price increases in this country, which has been steadily upward since August, 1921, of better conditions at home.

Adolph C. Miller, westerner, and member of the Federal Reserve Board, spoke reassuringly as to the outlook for the West in a recent visit to the Pacific

Coast. Mr. Miller is one of the foremost economists in the United States and when he says that "things are on the mend" he speaks with authority. He also pointed out that the eyes of the world are on the Pacific and in this connection is reported to have said:

"The war has demonstrated that the world is contracting, and whether we like it or not we are getting closer to our neighbors. America cannot withdraw itself from the rest of the world. The Washington conference has shown that the front door of the United States is on the Pacific instead of on the Atlantic. The Atlantic is an inland sea, whereas the Pacific separates two widely divergent parts of the world. There is developing here on the Pacific Coast to a high degree a great international perspective."

B. C. Forbes, the business expert, has produced some interesting facts concerning building costs that show it cost two and a half times as much to build a home in 1920 as it did in 1914. Expressed differently, a two-story frame house which cost to build \$5,529 in 1914 would have cost \$12,815 in 1920, whereas it could be built now for \$9,502. The following careful compilation is for a seven-room, two-story frame house 30 x 34 feet:

	1914	Peak, 1920	1922
Excavation	\$ 240.00	\$ 420.00	\$ 420.00
Foundations and cement....	470.00	1,459.00	1,167.00
Masonry	250.00	667.00	543.00
Plastering	359.00	262.00	392.00
Carpentry and glass.....	2,520.00	5,629.00	3,845.00
Painting	320.00	608.00	560.00
Plumbing and gas.....	350.00	686.00	517.00
Heating	400.00	1,029.00	712.00
Metal work	180.00	455.00	291.00
Tile work	40.00	87.00	54.00
Mantels	80.00	173.00	109.00
Electric	250.00	500.00	377.00
Hardware	70.00	140.00	98.00
Total cost,	\$5,529.00	\$12,815.00	\$9,902.00

Cost per cubic foot, 1914, 0.19; peak, 1920, 0.44; 1922, 0.325.
Per cent of change, 100%.

Forbes argues that we are reasonably assured there will be no material decline from these cost figures this year and that the wise man inclined to build will not defer action.

Whether an equitable distribution of the benefits which may accrue from the development of the Colorado River can be made between the states in the Colorado River basin, is a question which time alone can tell. Secretary Hoover is of the opinion that such distribution can be equitably made. Despite the fact that there were no direct results accruing from the Secretary's recent western visit other than the removal of some of the objections which the upper river states had raised to the proposed development, indirectly much was accomplished. The personal in-

vestigation of Mr. Hoover, by the tremendous publicity which resulted, served in a measure to fix in the public mind the importance to the West and to the nation of the economic development of water power resources. It served to focus the eyes of the nation, if but for a moment on the growing importance of electric energy. The newspaper accounts of the recent Colorado conference, which received national publicity, in explaining the purpose of the conference told the people of the eastern states something of what the West has accomplished. This alone was worth the visit. As soon as eastern manufacturers as a group realize what a few far-sighted ones have grasped, namely, the market opportunities, ideal climatic conditions, and future industrial possibilities of the West, the inevitable destiny of the West will be on its way to attainment.

Declaring that motor stage operators have no right to convert to their own profit the money paid by taxpayers for the construction and maintenance of highways, the Public Utilities Commission of Colorado has handed down a momentous decision which will form a precedent for decisions in similar cases by other state public utilities commissions.

The Colorado commission made an investigation of the transportation conditions in Eagle and Garfield counties, through which bus lines wish to operate, and found that in the two counties, although there were sixty-eight motor trucks operating as public carriers, they paid into the state treasury only \$819.27 per year for the use of the state and county highways.

The Denver and Rio Grande Western Railroad, which these buses parallel, paid during the same period \$38,023.94 for the public roads, and in addition, other taxes making the total in these two counties by the railroad company, \$153,896.94.

The portion of the decision which is of special import is that defining public convenience and necessity, which is as follows:

"Public convenience and necessity, by which must be understood the convenience and necessity of the people at large as contra-distinguished from the convenience and necessity of a very small number of persons who seek to derive a profit from the farmers' and home owners' investment in roads, never contemplated that the truck driver should destroy that, to the cost of construction of which he contributed little or nothing, or that he should reap where he has not sown. When the taxing laws of this state are so amended that the truck driver operating over state highways shall contribute his due proportion to the cost of construction and maintenance of our highways, then, and then only, can this commission regard his use, under proper conditions and restrictions, of a great and tremendously expensive public facility as of equal dignity and equal benefit to the people with the moderate use thereof by the ordinary taxpayer."

Letters to the Editor

Need for an Expedition to Study Swedish Iron as Model for Western Development

To the Editor:

Sir: It is a well recognized fact all over the world that Swedish charcoal iron stands at the very top of iron products. I want to call your attention to the fact that the conditions that exist today on the Pacific Coast are practically identical with those which occur in Sweden, as to the iron industry. We have here large deposits of high grade iron ore; we have large timber stands producing an enormous amount of waste material; we have abundance of hydroelectric power which, if treated correctly, would produce and supply cheap electric power.

In Sweden the iron industry relies on charcoal as its reducing agent, and until the electric furnace was introduced, charcoal blast furnaces were exclusively used for producing pig iron there. In 1910, or thereabout, the electric shaft furnace was developed, and since that time about 40 electric shaft furnaces have been placed in operation there, and it is reported that as soon as one of the old-fashioned blast furnaces goes out of commission, it is supplanted by an electric shaft furnace.

The reason for the use of an electric shaft furnace is primarily the fuel economy, and also the quality of material produced. The fuel economy is of course a vital question, especially in a country where the reducing agent, such as charcoal, is produced from growing materials at considerable cost. The underlying fact is that when operating a common blast furnace, two-thirds of the fuel is used for the purpose of heating the charge by combustion, and one-third of the fuel is used in doing actual chemical work—in other words, reducing the oxide to metal. Consequently, in the electric shaft furnace the electric current supplants two-thirds of the charcoal necessary to produce the iron. In other words, the same amount of charcoal will produce two-thirds more iron in an electric shaft furnace than it would produce in a blast furnace—a very large economy.

In my opinion, it is a great mistake for us out here to try to imitate the industrial conditions existing in Pittsburgh, Pa., or similar localities. We have not the pre-essentials for such undertakings, and on that account will never be able to compete economically with their manufacture. The only sound method of developing an iron industry out here, under our conditions, is to follow closely the lead of the Swedish iron industry, whose product is world famous today. Swedish iron could be produced equally advantageously out here on the Pacific Coast, and should be known as "California" iron.

Pig iron is a semi-finished product—consequently, the margin of profit on pig iron is small, and the financial success of a plant producing pig iron only, is dependent exclusively on the bulk of the output. The logical and sane way for the development of the iron industry here, therefore, is not in the manufacture of pig iron as such, since there is a small market, if any, for the type of pig iron produced in electric shaft furnaces. Pig iron on the Pacific Coast is principally of a low grade product, which will readily absorb into itself steel scrap, producing, in such a way, an acceptable foundry iron. Consequently electric shaft furnaces producing pig iron should be economically associated with the refining of the pig iron produced, and the final manufacture of steel products readily salable out here, such as angle iron, reinforcing brass, etc.; tool steels of various kinds, also wire, nails, and a multi-

tude of other smaller steel products which find a ready market on this coast.

As you know, I have made a very careful study of the iron industry, both abroad and out here. I have found it practically impossible to talk intelligently with most people in the West, due to their lack of understanding with regard to the conditions surrounding the Swedish iron industry. The only way the full understanding could be obtained by the people out here of the soundness of the Swedish iron industry and the soundness of its application to the Pacific Coast, would be for them to send out a commission from here to study in detail on the ground, the economical as well as the technical side of the iron industry.

I would be very pleased to cooperate with anybody that is interested along these lines.

J. W. BECKMAN, President.

Beckman and Linden Engineering Corporation.

Why Not Educate the Public to Change Fuses and Save Money on the Electric Bill?

To the Editor:

Sir: If anyone wanted to know how important a part electricity plays in our home and business life, he should take a turn at the trouble-call desk of a power company and listen to the complaints and the urgent calls for help as soon as the lights go out.

Every electric light company is well aware of its great responsibility in this respect and tries hard to keep this little world of ours on its proper course. And yet there is not 2% of this trouble that is caused by any fault or neglect of the company or by the failure of supplying electricity. Most of these calls come from homes, with faulty irons and cords as the most common causes. In the stores the cause is generally an increase in the size of the lamps or in the amount of lamps, which means an increase in current consumption and an overload on the capacity of the fuses. But in most all cases the renewal of fuses is all that is required to restore the service.

Years ago when the customers were few, free service for such calls was established by the power companies and has been maintained ever since. With the increased use of electricity, this free service is costing the light companies thousands of dollars every year. What is more, from the often amusing, and often aggravating and trying calls, it would seem that not very many appreciate fully this service.

What is at the foundation of all this helplessness on the part of the public? It is a most pitiable ignorance, an ignorance which is not warranted in this enlightened age—and a little propaganda of enlightenment on "How to help yourself" is surely needed.

Years ago, when electricity was less known and little used in the homes, people were afraid of it, but nowadays with electricity taught in every school in the land, with all kinds of electric appliances used in every home and electricity used everywhere, this fear and ignorance should not exist any more and a simple knowledge of applied electricity should be common in every household and to every business man.

How much inconvenience could be avoided if every householder knew how to locate and replace a burned-out fuse? It is more simple than lighting up an oil lamp and everyone knew how to do that, without burning their fingers or setting the house afire! This ignorance almost borders on the criminal when a big apartment house becomes affected or, as it even has happened, that a hospital was in darkness for some time because nobody in the place knew how to replace a fuse or even knew where the meter and cutouts

were located. There are storekeepers today that have never taken the pains to locate their electric meters and cutouts.

Why should some apartment house owners be allowed to put this burden of light maintenance on the shoulders of an electric light company any more than they would put the heat maintenance on the coal dealer?

The remedy for this helplessness is, to educate the public through simple printed instructions or by demonstrations given by the electrical contractor, dealer, or by the electric company. And as charity begins at home, every one of the employes of the above mentioned concerns should know or learn how to help themselves.

The electric light company should find it very easy to start this educational campaign, as the monthly bill cards could be employed as a little messenger, carrying a few simple rules of "How to help yourself" to every household. These rules could be printed on cards like the meter reading instruction cards and distributed to every one asking for them, as well as left in the places where the trouble man makes a call or the meter man sets a meter.

It is the conviction of the writer that this educational campaign would prove beneficial to all concerned and if carried on for some time, no man with the average intelligence would call for the trouble-man except in cases where his own efforts have failed to get results.

JOHN W. MELHORN, Operator.

San Diego Consolidated Gas and Electric Company.

Notes of a Western Engineer on Conditions in Europe from an American Viewpoint

To the Editor:

Sir: During my recent trip to Europe I jotted down various notes on my observations, some of which have bearing on western situations and may be of interest to your readers.

Times are slack in all different European countries, with the possible exception of Germany—and conditions are by no means rosy in Germany. The great mass of the German people are poor and living conditions are hard for them. One is apt to think that things even in the United States are not what they used to be before the war, especially in regard to labor efficiency—but this is true to a much greater extent in Europe, even in countries which did not take part in the war. I was surprised to find great apprehension in Germany as to their ability—or rather inability to compete with U. S. manufacturing concerns in the open market on the ground of the lower efficiency of their labor compared to what it had been before—and compared with American systems and labor conditions. In America I had heard just about the same story before I left on my trip, only it was American concerns being afraid of German competition.

The Swedish government is constructing two multiple arch dams 60 miles above the Arctic Circle. On account of the extreme low temperatures at this latitude, special care is taken with the reinforcement. Construction work often has to be continued even at very low temperatures in order to finish the work within a reasonable time. There are no railroads in the country for the last 100 miles. The men are brought in by airplane (in charge of a man who was Colonel in the English Flying Corps during the war) and the material is brought in on barges (in charge of a former German submarine Captain). The work as a whole is in charge of a bureau—or what amounts to a committee of engineers. It seems to be general practice to send an engineer to the United States every now and then to study the latest developments in the various branches of engineering

and then to introduce all possible advantageous improvements at home. In certain lines, business interests in the United States could benefit by doing the same thing—that is, by sending engineers to study in Sweden.

When in Sweden I visited a large cable works where submarine cables for voltages up to 35,000 were made as regular standards. I have always been impressed with the fact that the United States was leading the world in everything electrical, with but few exceptions. Among these exceptions are high voltage submarine cables. There is no sufficient reason, for instance, for keeping the voltage of the submarine cables crossing San Francisco Bay down to 11,000 volts, other than that home factories are not willing to go any higher. It is certainly not an economical voltage for the power companies, although I can readily see that it is for the cable manufacturing companies. The Swedish factory has made and laid several 35,000-volt cables, one of them in water as deep as 330 ft. Twenty years ago there were cables in Germany operating at 30,000 volts—and they are still working.

The war has brought great changes in Denmark. Although the country directly profited by the war, prices are very high, a fact which is difficult to explain. It seems that the government owns and operates nearly all large enterprises, such, for instance, as the railroads—and does it very uneconomically. The railroad fares, third class, equaled first class in the United States. One would think that in a densely populated country such as Denmark, railroading would be a good business at fair rates—but even with their very high charges, the Danish railroads are now run at a loss. The same is the case with street car operation in Copenhagen, but that kind of business seems to be bad almost everywhere.

The first thing I saw on arriving in Edinburgh were big signs saying "Prohibition works against personal liberty, therefore vote no change." There had evidently just been an election on prohibition. It did not carry—it was wet everywhere I went—even the climate. The Scotch had evidently decided on no change. Before this trip, I personally was against prohibition as being actually against personal liberty, but I have now come to the conclusion that from a national point of view it is not bad—and one should really look at it that way.

The hydraulic laboratory of the University of London is very well fitted out and students are working there from every country of the world, including Japan. In the laboratories for testing material there is much empty space, which I was told would remain empty until the exchange went to normal—then it was to be filled with American testing machinery which was known here to be the best obtainable. Some very interesting tests on reinforced concrete arches have been made in the laboratory. An arch with a height of about 10 feet had deflected 3 inches and come back again. According to calculations, such deformation should not be possible without crushing the material.

In making estimates, it is surprising to find how near the cost of hydroelectric construction comes out the same in various countries under similar conditions as to location in the mountains. If labor is cheap in a country, one can be sure that this labor is also inefficient and does not produce much.

As a general rule, electric power costs the consumers considerably more in Europe than in the United States, with the possible exception of Norway.

Any trip to Europe at this time must be both interesting and beneficial—it also teaches one the advantages of living in the United States.

LARS JORGENSEN,

San Francisco, Cal.

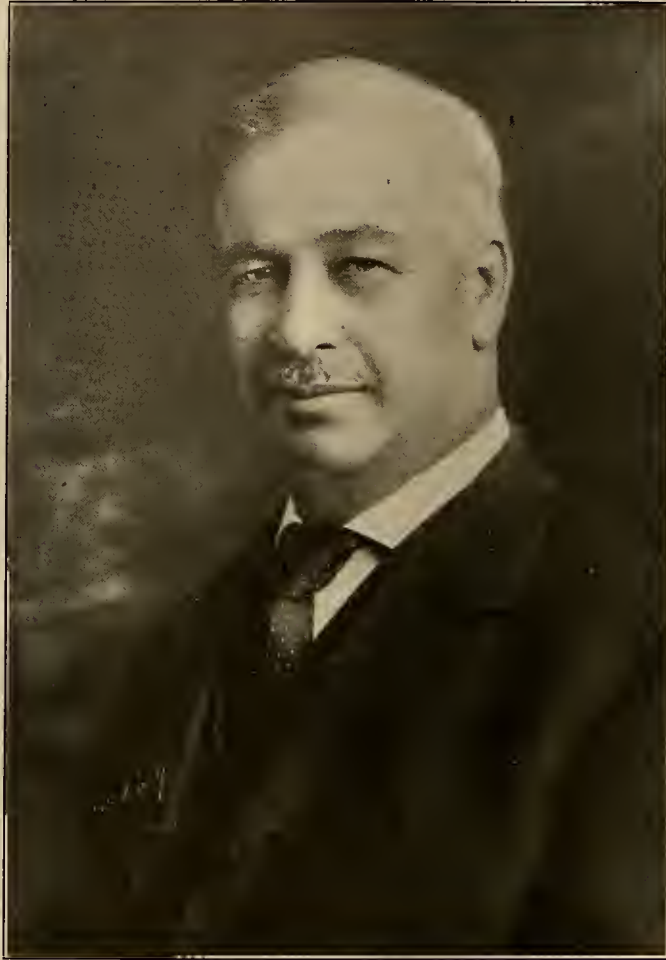
Consulting Engineer.

Builders of the West

IN the upbuilding of a great and prosperous industrial empire, capital and industry must go hand in hand, and the growth of an industry in any community is largely dependent upon the vision and judgment of its financiers and bankers. In the banking circles of the Pacific Northwest there is, perhaps, no other one man whose advice and opinions in financial and banking matters have been so eagerly sought after, and who has proven such a stabilizing factor as A. L. Mills, president of the First National Bank of Portland, Oregon.

Mr. Mills was born and educated in New York. He was graduated from Harvard University with the class of 1881. It was in 1882 that he turned his footsteps westward toward Oregon, even then a semi-primitive country holding forth the same glamor and romance as it did in the days of Lewis and Clark. His first venture in the new country was as a stock-raiser in Yamhill county. It was then that he learned of the dependence which the agriculturist and cattleman must place upon his banker. It was but a short time later that he forsook farming and went to Colfax, Washington, where he entered the banking business. It was in 1890 that he came to Portland and organized the Security Savings and Trust Company, himself taking the active direction of its policies and affairs as vice-president. The Pacific Northwest, in its earlier days, was looked upon rather dubiously by the financial interests in the East who were in a position to aid in the development of its vast natural resources. It was the pioneering instinct, the conservativeness, the stability and foresightedness of such men as Mr. Mills who directed local capital in the development of the great agricultural, cattle and sheep raising industries, the utilization of the vast forest resources, the opening of the mines and the growth of the fisheries.

For the past forty years, Mr. Mills has been closely identified with the upbuilding of the industries of the great Northwest. Assuming the presidency of the First National Bank of Portland in 1903,



A. L. MILLS

Who, as president of the First National Bank of Portland, one of the Northwest's largest and strongest financial institutions, has devoted forty years in aiding the development of the western industrial empire through judicious supervision of the finances in one of its most progressive districts.

for the past two generations he has been prominently linked with almost every constructive enterprise in that section of the progressive West. His advice and judgment on matters of finance and business are appreciated, not only locally, but in the East where he is regarded an authority on financial matters.

As a reader and student of history of economic problems he has devoted much thought and study to banking legislation. He served in the Oregon State Legislature as speaker of the House, from 1903 to 1905, and has been credited for a large amount of the banking legislation now on the statute books of the state. He was a member of the Federal Advisory Council from the Twelfth District, serving with distinction in that capacity for three years.

Although held to be highly conservative and often criticized for his conservatism, his exceptional farsightedness and keen judgment have many times been proven.

As a leader of public thought, his opinions have always been highly regarded. During his administration the First National Bank of Portland has come to be recognized as the largest and strongest financial institution north of San Francisco and west of Denver. Much credit is due to him for helping to avert a serious financial panic in Portland in 1907.

For all his responsibilities and active business life, he is a man of genial personality and counts among his friends hosts of men to whom he has been of vital assistance during their business careers. Nor has all of his time and activity been devoted entirely to business. His interest in the welfare of his fellow men has taken him into other fields. He is president of the Portland Open Air Sanitarium and a director of the National Association for the Study and Prevention of Tuberculosis.

Because then of Mr. Mills' contribution to the upbuilding of the West, not in the organization of a large industry, but in helping to finance industry and point the way to success, this issue of Journal of Electricity and Western Industry is affectionately dedicated.



The Crockett refinery of the California and Hawaiian Sugar Refining Corporation on San Francisco bay, where electricity has been scientifically applied to solve many difficult problems. The refinery is reputed to be the largest in the world, handling 2000 tons daily. It is capable of refining the entire crop of the Hawaiian Islands. The plant is admirably situated as far as transportation facilities are concerned. Half a dozen

steamers can discharge raw sugar at one time along the 3000 feet of deep water dockage space while the entire season's output of 600,000 tons is practically all placed in cars for shipment to various parts of the United States. At no time does manual labor enter into the handling of the bags of sugar, electrically operated material handling devices doing all this work.

Applying Electricity Scientifically to Factory Problems

An Example of What Can Be Done in Adapting Electricity to the Special Needs of a Factory as Illustrated by the Modern Equipment and Carefully Planned Layout of the California and Hawaiian Sugar Plant

By LOUIS F. LEUREY
Industrial Electrical Engineer

THE sugar refinery of the California and Hawaiian Sugar Refining Corporation at Crockett, California, is one of the largest industrial plants on the Pacific Coast, and in extent and diversity of electrification is at least the equal if not in advance of most industrial plants in America.

The use of electricity in manufacturing is divided into two general classes. In the first of these classes electricity is used as a motive power doing the work which was formerly done by steam engines, gas engines, and other prime movers. In the second of these classes, electricity is used as a medium for the accomplishment of industrial processes. The use of electricity as a motive power is the one most generally observed in current industrial practice, as this type of application can be most readily promoted by the electrical power and manufacturing companies who have pioneered the applications of electricity in the fields of manufacture. In the second case, both manufacturers and power companies have been handicapped in securing the application of electricity in process work, due principally to the fact that these applications call for an intimate knowledge of the industrial process. The manufacturer himself shows little inclination to initiate any advanced use of electricity and generally depends upon outside suggestion.

As the electrical manufacturer and the industrial plant manager do not speak a common language, in the technical sense, it is not surprising to find that electrical applications of a process character find their widest application in those plants that have on their staff or retain electrical engineers, capable of thoroughly interpreting the requirements of the electrical industry and of the manufacturing companies to each other. The California and Hawaiian Sugar

Refining Corporation have such an organization and the extent and success of their electrification should be of interest to any other types of manufacturing because the underlying principles are, after all, common to all types.

Source of Electric Energy

At the refinery at Crockett, the character of the refining process is such that a large quantity of exhaust steam is required for manufacturing purposes. Taking advantage of this condition, the company installed its own steam driven electrical generating plant. The exhaust steam from the turbine engines is used in the refining process while the electric energy, being in effect a by-product, is used to furnish power for all driven equipment. This power plant is complete with its own switchboards and operators and is, to all intents and purposes, a central station supplying an outside consumer.

The main feeders are all of a uniform size and are routed through the refinery until they accumulate a load equal to their capacity and no more. When further energy is required to meet extensions, a new and additional feeder is run from the central power plant. By this means the investment in electrical distribution equipment is all active and participating. In the same manner sub-distribution switchboards are established at convenient points in the refinery and the main feeders are broken up into smaller feeders capable of handling a single large motor or a group of small motors. In a similar manner these feeders are all routed in the refining areas so as practically to checkerboard the entire space with available sources of power. These feeders are all working up to their carrying capacity and give extreme flexibility in maintaining the changing demands as improvements occur in the refining process.

Arrangement of Motive Equipment

At the present capacity of the refinery, namely 2000 tons per day, 700 motors having an aggregate capacity of 10,000 hp. are connected in the network. These motors vary in size from 1 hp. to 350 hp. with 15 hp. as an average size. Practically all are of the common squirrel cage type, but due to the preponderance of small sizes which have inherently low power factors, about 1000 hp. in synchronous motors and static condensers have been installed as a corrective measure. The synchronous motors were connected to centrifugal pumps and air compressors where they were especially suited to the character of the drive, and the static condensers were put on main distribution feeders where the load was very variable in character, and of an exceptionally low power factor. With these corrective measures, the power factor of the central station has been raised from 75% to 82% with a corresponding increase in the capacity of the turbo generators.

In installing the starting equipment on motors, standard steel supports were designed which carried not only the starting equipment but a disconnecting switch of the externally operated type. This equipment is all arranged for ready removal, as a unit, from one part of the property to the others as the changing demands of manufacturing may require. The disconnecting switch at each motor offers a safe and quick method of making a routine inspection of motor and starter with a view to forestalling interruptions in operation. The control equipment is all designed to minimize the effect of accidental shutdowns and a complete signal bell system is installed between the various sugar stations to facilitate speedy starting up. In special cases where a train of important conveyors all dump the product into one another, electrical interlocking devices are installed so that if the end or intermediate conveyor should stop for any cause, the interlock will also stop all other motors in the conveying train. In the warehouses where sugar is stacked 64 tiers deep and where 13 separate trains of conveyors are in service for handling the great tonnage of sugar necessary, a master system of control has been devised so that any units of the 13 trains can be grouped together by means of a plug switchboard. By this means they can be automatically electrically interlocked with each other. This system has not been put into effect to date because the accidental stoppage of the conveying equipment has been negligible and it has not been thought advisable to complicate operation under these condi-

tions by the installation of an automatic system of control.

Signals and Communication

In order to coordinate properly all of the diverse functions of the refinery and to overcome quickly any interruptions to continuous operation, a complete signal and communication system has been installed.

In addition to the signal bell system noted in a previous paragraph an extensive calling system has been installed. The central station for this system is located in the main office in the day time and at the gate house at night. From these stations an automatic code is sent out through loud sounding bells and horns in every section of the property. In order to make this calling system effective a comprehensive telephone system was installed to parallel with it so that the men being called could immediately get in touch through the nearest telephone with the central office and get instructions.

A fire alarm system of the complete automatic type and self supervising is in operation and this system is also used to blow a standard time signal from the factory whistle.

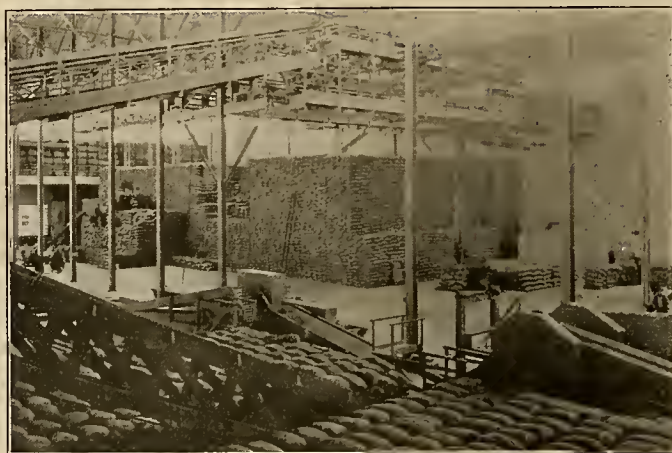
In addition to the above communication systems a telautograph system has been installed between the central office and the shipping and receiving departments for transmitting written instructions. A Lampson tube system is also in operation between the

office and the shipping and receiving departments for the transmission of documents.

In order to keep the executive offices and the production manager in complete touch with the refining process and in order to keep an accurate account of the product, a complete electrical counting system has been installed. Having failed to find an existing counting apparatus to meet their exacting requirements, the electrical department in conjunction with a local manufacturer, developed a splendid counter by adapting the parts of an electrical maximum demand meter. By the installation of contact triggers of substantial design, these instruments are now faithfully recording sacks of sugar instead of kilowatt-hours. Many of the points of count are at remote distances but all of the counters are located at central positions in the refinery where they both indicate and record the complete flow of sacked product through the factory.

Special Applications of Electricity

In addition to all of the applications of electricity, both as a motive power and as a medium, noted in the above paragraphs, the California and Hawaiian Sugar Refining Corporation is continually



Every square inch of warehouse space must be utilized at the refinery for storing the annual output of 600,000 tons. This is done by means of an extensive system of electrically operated conveyors, controlled from a central station. Manual labor is practically eliminated in stacking the bags of sugar. The "high pilers" in the above picture stack the sugar in tiers sixty bags high, enabling the storage of approximately one ton of either raw or refined sugar per square foot of warehouse space.

investigating new forms of applications tending towards the most complete usage which can be economically secured. Naturally in a refinery using both steam and electricity, great care must be exercised in maintaining a balance so that a surplus of exhaust steam shall not occur, as this very rapidly and seriously affects the economy of the entire plant. Consequently, on all heating applications this balance is kept in mind. In the box drying plant where wooden boxes must be thoroughly dried for the receipt of powdered sugar, the advantages of electrical



Twenty-two direct connected centrifugals are operated from this single motor control board. Each is operated by a 30-hp. motor. The centrifugals are self-discharging. This is but one portion of a control system that has eliminated waste labor and the enormous upkeep of an elaborate system of line shafting and belting. Above the control board is a portion of the electrically operated signal system.

control were so manifest that it was adopted for this entire section of the plant. A large number of electrical heaters are installed in this section of the plant for maintaining dryness in the box wood and a fine control is secured by a horse hair humostat which actuates a sensitive relay and through this relay controls contactors that cut in and out sections of electrical heaters. This system has been in operation for several years and runs with only a nominal cost for attendance. A certain amount of office and hotel heating is done electrically where it has proved uneconomical to extend the steam mains, and a complete electrical shop with ovens for drying motor windings and a complete electrical test equipment installed. Both oxy-acetylene and electrical welding are found side by side in this refinery, each doing the class of work for which it is preeminently suited. Many special electrical controls for automatically operating syrup gates and valves are either installed or in the process of installation and extensive experiments are under way in an attempt to regenerate electrically Kiselguhr and Bone Char, two of the most expensive operations in the sugar refining process. This work of regenerating is now being accomplished by means of direct oil fired furnaces. While the heat content of electric energy per dollar is not comparable to the heat content of oil, the heat in the energy can, however, be applied with vastly increased efficiency and there is hope for a successful termination of these experiments.

Anyone who has viewed the refinery from the Stockton river-boats or from the main lines of the Southern Pacific has always commented on the spectacular quality of the night appearance. This appearance, however, is only an incident in the design of the illumination for its main purpose was to permit the manufacture of sugar as successfully at night as could be done in the day time and 20,000 lighting outlets have been installed.

Electrical Maintenance and Operation

The whole electrical operating department at this refinery is trained to carry out these two primary principles of good operation:

First—Foretell all possible trouble by rigid program of inspection and upkeep.

Second—Be prepared with complete equipment and exact instructions to handle shutdowns when they occur.

To accomplish this the operating electricians are each given a definite area or class of equipment within the refinery for which they are made responsible and a routine of inspection duties is outlined for each man with a thorough system of reports.

Building For the Future

The greater part of the success which this company has secured in such an advanced type of plant at Crockett is due to the broad and far-sighted policy of the management in attracting to their service a



The main switchboard in the central power plant which controls the output of three 1500-kw. turbo-generator units, distributing the energy through the various portions of the refinery over sixteen feeders. Electricity is a by-product of the plant. Great quantities of low pressure steam are required in the refining of the raw sugar. Steam is generated at a pressure of 140 lb., run through the turbines, and discharged into the steam mains of the plant at a pressure of 10 lb. per sq. in. The turbines simply replace the low pressure reduction valves which would be necessary to prepare the steam for use in the refinery.

high-class engineering and technical staff. Not content with this, however, this same broad-gaged management went outside of their own organization to secure the cooperation of engineers whose experience had been in many other lines of manufacture and they have thus brought to the solution of their problem the group experience of the entire manufacturing and power field. By this policy not only do they reap the reward of a splendid and efficient plant in the present but have the assurance that for many years in the future they will still have a modern plant when less far-sighted contemporaries will be struggling with obsolescence.

Western Labor Relations on the Way to Sound Solution

The Special Advantages of the Western Labor Situation, Based on the Willingness of the Large Employer to Maintain His Interest in Bettering Conditions During Periods When No Labor Crisis Forces Concessions

By GEORGE L. BELL
Industrial Consultant

AFTER the industrial depression set in some time ago, when instead of a labor shortage there began to be a labor surplus, when the period of constant wage increases and general restlessness of labor ended, far too many industrial executives settled comfortably back in their desk chairs with a "Thank-God,-that-is-over" attitude, and began to devote their entire attention to the other problems of their business.

Fortunately, in western industries fewer managers seem to have swung to this extreme. This is largely due to the fact that in the West the pendulum never swung so far the other way in the matter of war and post war enthusiasm over the myriads of newly discovered cure-alls and panaceas for the problems involving the human element in industry. Because of the comparative isolation of its industries, the West was not so much affected by the epidemic of what might be termed fads in dealing with labor that affected eastern industrial plants. There many of the profit sharing and bonus plans, employee representation, and community welfare schemes, etc. were carelessly thought out and were adopted in haste and despair; and, unhappily, few of them were based on real convictions and deep sincerity of purpose. The natural outcome has been the precipitate abandoning of many of these schemes as soon as the balance of power returned completely to the employers. In the West industrial managers have "kept their feet on the ground," not because they are less progressive or less willing to try new ideas than their fellow easterners—for they are more inclined the other way—but because their labor problems were perhaps not quite so pressing, and because they are more inclined to deal with the substance than the form.

Going to the Dentist Before the Toothache

As an illustration in proof of the assertion that western employers have not gone from one extreme to the other in this period, may be cited the case of a large manufacturing concern in a one-industry town in the San Francisco bay district. In these unincorporated, one-industry towns, more or less a distinctly western development, there is a merging of industrial and civic life which presents mixed industrial relations and community problems. This company had created an employment and personnel department long before the war, gradually yet steadily developing its scope and functions, and had also given much attention to the erection of buildings and many facilities for recreation and community use, all of which were maintained and managed by the company. Long after the war a careful study was begun as to the manner of operating these community institutions, and the use made thereof by

the employes and townspeople. Finally, in the very midst of the industrial depression, when not only the problem of labor turnover had ceased but when there was a large surplus of labor available, the company decided, as a result of the thorough survey, to turn over the complete control and management of all the club houses, the social hall, the athletic fields and parks to the employes and other residents—the company continuing to pay its same proportion of maintenance costs but retaining no veto power other than the right to forbid the sale or burning of the buildings! Whatever one may think abstractly concerning the wisdom of this action, it was an action taken on the basis of real conviction as to facts, principles and policy; and not a move based on hysteria and expediency, nor made with the desire of trying to placate restless workers.

The West in the Lead

The development of large industries in the West is comparatively recent. In the smaller plants the pioneer spirit has prevailed in both management and men, and the day-to-day, man-to-man problems were rather easy of solution. It is only with the coming of large plants, where the human contacts have become more remote and complicated, that the West has had to face really complex industrial relations problems. But even there the western traditions of virility and of "man fashion" dealing have exerted a real influence in working out adjustments to meet the new conditions. There seems to exist a fairly clear realization that there can be no static solution for these continuing, changing problems. But there is a static determination to create the proper sort of human attitude and human machinery for meeting these problems as they arise.

Because of this prevailing spirit there is a very real possibility that the West may lead the country in establishing and maintaining stable industrial relations, just as it has frequently led in inaugurating sound progressive civic and political movements. If western employers will generally continue to refrain from taking selfish and short-sighted advantage of present economic conditions, and will continue to do constructive thinking and to devote attention to the human element phases of their industries, they have a fine opportunity for establishing a national standard. It is in times like the present that the best permanent results can be accomplished, for both employers and workers are in a frame of mind which permits of sound thinking and frank discussion, based on facts rather than on emotions, and untrammelled by hatred and fear. Right now employers have the best opportunity of convincing the workers of the sincerity of their motives and objectives.

A happy instance of at least a hopeful collective attitude on the part of western employers is to be found in the actual accomplishments of the Industrial Association of San Francisco in connection with the building industry during the past six months. This association was organized last summer during a bitter strike and lockout in the building trades. It was initiated, not by the building contractors and employers, but by business men and employers generally for the purpose of protecting the interests of the community at large in this basic key industry. The men who organized it did not do so with the object of gaining unlimited power for the building contractors, who had worked steadily under closed shop conditions for over twenty years; nor did they aim to break the unions. Instead of frittering away their energies in raving against and worrying about the organizations of building trades labor, they concentrated upon organizing themselves for constructive work, for doing positive things rather than negative things. When the men went back to work under the "American Plan," the association, as a part of its program, saw to it that short-sighted contractors did not take purely selfish advantage of the new power in their hands. Furthermore, the association put into effect a real plan in connection with the announcement of the adoption of the "American Plan" principle—a thing neglected by many similar associations elsewhere in the United States. It did not arbitrarily cut wages, but set up an impartial wage board of prominent disinterested community leaders, which fixed a scale of building trades wages for one year; it maintained the eight-hour day, five-and-a-half day week, with time and a half for regular overtime and double time for Sundays and holidays; it maintains a staff, with field inspectors, to enforce the payment of the wage award of the impartial board, to prevent discrimination by employers against either union or non-union men, and to hear and adjust any complaints of union or non-union men; it is financing and operating training schools for the development of apprentices in the highly skilled trades wherein there is a serious shortage of mechanics.

While the association just referred to is always prepared for militant action to maintain the conditions established in the building industry, or to aid any industry to get on the same basis, yet it is not militant purely in the interests of the employers. It puts public interest first, and is endeavoring to maintain only the proper balance of power between employers and employes, realizing that absolutely unrestricted, unlimited power in the hands of either group in any industry is almost certain to be abused, and the general public made to suffer in the end.

Hopeful Outlook Through the Individual Plant

Of course the ultimate test in these matters will have to be met in the individual plants of the employers, where is located the real contact point, since general associations are in the main only policy-forming and educational. But it does seem that, in San Francisco at least, this educational campaign is headed in the right direction and is bound to have

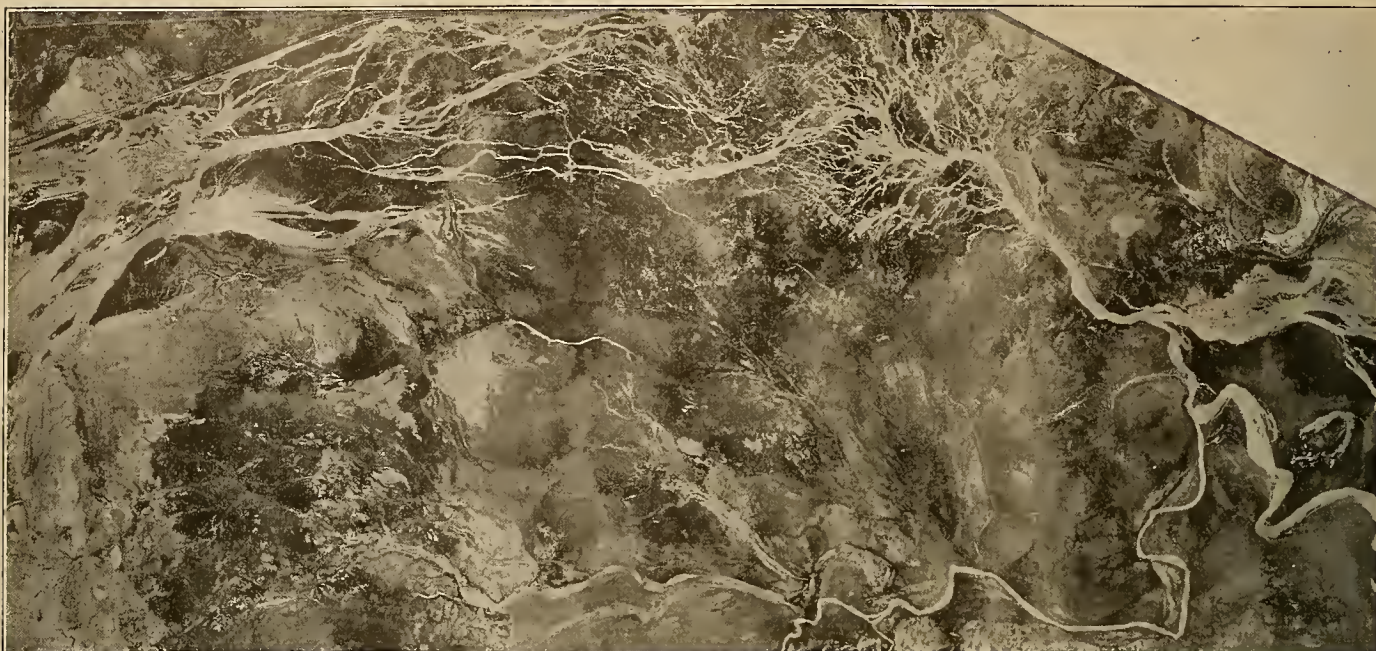
a good effect on individual plant managers. And, I repeat, there is a graifingly large number of western employers who have not permitted a backward swing of interest in their personnel problems, and who are continuing to carry on constructive work in that field. While many eastern plants have summarily eliminated their industrial relations or employment departments during the past two years, most large western plants, which had such departments, continue to regard them as fixtures in the business, necessary as organized contact points of human relationship where the size of the work force makes it impossible for the employers or plant manager to serve regularly and effectively in that capacity. And, in cases where the magnitude of the enterprise does not justify the maintenance of an industrial relations department, there are hundreds of western industrial executives who are giving systematic attention and study to their employment relations and the proper placing of men, to the training and development of their employes, and to the careful carrying out of policies of fair dealing in the adjustment of wages and working conditions. Of course a great number of discouraging examples could be produced to show the darker side of the picture, but it seems more than probable that the views and policies of the forward-looking groups in western industry—though they may be considered, for the sake of argument, to be in the minority—will prevail, because they are based on sound common sense and on an analytical estimate of the relative importance of the factors entering into industrial production.

California City Operates Swimming Pool as By-Product of Municipal Power Plant

Power plants very seldom produce by-products, yet at Palo Alto, California, there is operated in conjunction with the municipal generating station a swimming pool which has become so popular that its discontinuation would bring a storm of protest from the entire community. It is an open air pool and is operated throughout the year with no charge being made for its use.

Its connection with the power plant comes through the heating of the water in the pool through turning the cooling water from the plant Diesel engines into it. Previously an attempt was made to cool the water from the engines by passing it through a cooler on the roof of the plant. This was unsuccessful and the hot water was turned into the city mains. The temperature of the domestic water supply in the vicinity of the plant was raised to such an extent that this practice was objectionable so the scheme of running the hot water into a swimming pool was tried out as a possible solution to the problem.

The pool is circular in shape with a conical bottom and has a capacity of 176,000 gallons. The Diesel engine requires approximately 130,000 gallons of water per 24 hours while 124,000 gallons of fresh water enters the tank in addition to that from the engines during each 24 hours.



THE MAJOR ARGUMENT FOR IMMEDIATE ACTION ON THE COLORADO

Airplane view of one of the danger points on the delta of the Colorado, showing how the river has left its channel at numerous points. The westerly end of the Volcano Lake levee is shown at the upper left. Every succeeding flood season makes the danger to the Imperial Valley region

more imminent and relief is imperative if the river is not to top its levees with the next heavy rains. The picture was taken from a 12,500-ft. elevation by the Pioneer Aerial Engineering Company of Beverly Hills, California, and is copyrighted.

Controlling the Principal Artery of the Southwest States

One of the Foremost Authorities on the Colorado River Discusses the Situation Now Before the Colorado River Commission in the Light of the Future Industrial and Agricultural Possibilities of the Southwest

By C. E. GRUNSKY
Consulting Engineer

THE Boulder Canyon damsite is located just above the point where the Colorado River makes its abrupt turn from a westerly to a southerly course. It is some 60 miles in an air line above the point where California's east boundary line strikes the river and is between three and four miles below the mouth of the Virgin River. The river at this point forms the boundary between Nevada on the north and Arizona on the south. The canyon is narrow, being generally reported as about 250 feet wide for a distance of one-half mile. The sides of the gorge are steep. The rock is granite. The project for storage at this site as now favored by the United States Reclamation Service involves the construction of a dam that would rise to a height of 550 feet above the water surface of the river, forming a reservoir with a storage capacity in excess of 25,000,000 acre-feet. The discharge of Colorado River at this point may be noted, in approximate figures, as ranging from 7,000,000 to 22,000,000 acre-feet per year. The normal annual discharge of the river is about 15,000,000 acre-feet. The water of a full reservoir would extend up the Colorado River into the lower end of the Grand Canyon. A large portion of the storage space would be afforded by the lower valley of the Virgin River. The surface area of the reservoir may reach 125,000 acres from which the loss by evaporation would be about 750,000 acre-feet per annum.

The feasibility of a dam of the dimensions proposed seems now to be generally accepted by the engineers who have investigated the dam site. A reservoir at this point would control the flow of the Colorado except the contributions by the Gila River, and could be so manipulated that it would eliminate the lower river flood menace to the extent that it is due to up river high stages. It would regulate the flow of the river for irrigation purposes and would permit the generation of about 600,000 horsepower. The power thus generated would be available for use at points as far removed as San Francisco, but the principal place of use would naturally be in Arizona, Nevada, southern Utah and southern portions of California.

The up-river use of water for irrigation is increasing. Some small diversions of water from the headwaters of the Colorado River into adjacent drainage basins are already accomplished and others are under contemplation. It is not now known to what extent this up-river use of water will decrease the discharge of the river through the Boulder Canyon and there is consequently some conjecture as to whether the above indicated power output can be realized. In any event there will always be a sufficient flow to make storage worth while, and the natural flow alone to which unassailable down-river rights have already been established by beneficial use would justify the use of the water in generating

power if a dam of any considerable height is placed in Boulder Canyon. It may be noted in this connection that the Yuma project will require a summer flow of 1500 to 1700 second-feet and has been actually using 1100 to 1200 second-feet. Imperial Irrigation District for use on the lands of the district and on a smaller area in Mexico, has been diverting and using over 6000 second-feet in summer and more than one-third of this amount at times of minimum demand in winter. So, too, at Palo Verde there has been diversion and use on a large scale. Plans for extension of irrigation in the lower river regions



Some idea of the extent of the Boulder Canyon reservoir can be gained from this view of the arid valley above the dam which will be entirely filled with the waters of the Colorado.

have been made, notably in the case of Imperial Valley where it is proposed to add some 400,000 acres to the irrigated area. But any such extension of irrigated areas is conditioned on conserving the present wastage of flood waters. This wastage is large as will be seen when the volume of flow reaching Laguna Dam, about 16,000,000 acre-feet per year, is compared with the amount diverted by Yuma Reclamation project and the Imperial Irrigation District together, about 2,500,000 acre-feet.

Another Colorado Flood Imminent

There is another urgent reason, aside from extension of irrigated areas and power development, for the early construction of a big regulating reservoir somewhere not too far up on the Colorado. This is the control of floods. The floods on the lower river have become a serious menace to the river's delta lands. Adequate storage facilities on the river under proper control would reduce the peak of all flood discharges except only those which originate in the watershed of the Gila River. It should be noted, however, in this connection that such storage alone will not completely solve the flood control problem. Colorado River is now running wild in that portion of its delta which lies to the southward of a line about 20 miles south of and roughly parallel with the south boundary of California. Ever since the river abandoned its channel at a point near the south line of Arizona in 1909 it has been flowing westerly from that point and has piled its drift and silt into the Volcano Lake region. The lake has been practically obliterated by silt deposits. In consequence of the increasing obstruction thus placed in

the way of flood water the flood plane is rising at the rate of about one foot a year and has now progressed to the point where the river at its high stages will begin again to overtop its natural banks in the 20-mile stretch in which the river forms the boundary between Arizona and Mexico, and its high waters may become a menace to levees whose bases have been barely lapped with water for some years past. This situation demands action which should not be delayed. The United States should take whatever measures are necessary to secure the right from Mexico to put the Colorado River back upon a direct course to the Gulf of California and this should be done at once regardless of whether storage works are constructed or not.

One Hundred Eighty Million Tons of Silt

The silt carried by the river is a factor to be considered in the planning of storage facilities. The river carries in suspension annually about 180,000,000 tons of silt and rolls some more along its bottom. An average of over 100,000 acre-feet of well compacted sediment are brought down to the river delta annually. Perhaps 80,000 to 90,000 acre-feet of deposit in a reservoir at Boulder Canyon should, therefore, be expected. This would, of course, accumulate in the up-stream portions of any reservoir that is at the points where the water loses its silt transporting power. If the Boulder Canyon project is carried out, it would take the silt about 30 years to destroy one-tenth of the proposed storage capacity, consequently deterioration due to the accumulation of silt in the reservoir is not a serious problem from an economic standpoint.

The Advantages of an Upper Dam

As an alternative to the early construction of the Boulder Canyon project a reservoir farther up-stream above Lee's Ferry in Glen Canyon has been suggested. Here, too, there is a narrow canyon but



The three rafts of the U. S. Reclamation Service at the site of the proposed Boulder Canyon dam engaged in drilling to determine the rock formation on which the dam will rest.

the walls are sandstone instead of granite. A loose rock dam with an effective height of over 700 feet and a storage capacity of over 40,000,000 acre-feet has been suggested for this site. A reservoir at the Glen Canyon site would be less effective in control-

ling floods, being some 300 miles farther up stream and it would be farther removed from the power market. But a dam at this point would have the particular advantage of so checking and regulating the major portion of the river flow that the construction of other dams farther down stream would be facilitated. Its construction, although perhaps not to the extreme height suggested, would be in line with the ultimate maximum utilization of the river flow because if used in conjunction with a high dam at some down-river point, the water from this upper storage could be liberated at rates adjusted to power requirements without regard to irrigation demands and the regulation for irrigation would be effected entirely at the down-stream reservoir.

Water Enough For All

There are one or two facts which stand out prominently, as for example the apparently slight effect of the increase of the use of water at up-river points upon the amount of water which reaches the Laguna Dam near Yuma. The records of discharge lack the accuracy and fail to go back far enough to make the effect of up-river irrigation of about 1,150,000 acres upon this flow apparent. To what extent then will the addition of perhaps 1,600,000 acres more to this irrigated area reduce the flow? Of the 3,000,000 acre-feet of water required for this area a part only, say 2,000,000 acre-feet, should be subtracted from the down-river discharge. Assuming the minimum yearly supply at Boulder Canyon to be 7,000,000 acre-feet under present conditions and the normal about 13,000,000 acre-feet then without restricting the use of Colorado River water for irrigation in Wyoming, Colorado, Utah, New Mexico, Arizona and Nevada, there will still be 3,000,000 to 9,000,000 acre-feet of water per annum that will go to waste after supplying the present needs of lower river irrigators who now have some 700,000 acres in cultivation.

Storage on a large scale is essential to reduce this waste and to make some of the water of the years of larger flow available in the years of light run-off; but in analyzing the effectiveness of a reservoir for this purpose it must be remembered that if the water released from storage is to serve both for the generation of power and for irrigation, the head at the dam should never be completely sacrificed and that, therefore, the effective reservoir capacity should be entered into a calculation at much less than the full capacities as above noted.

The cost of providing a reservoir at the Boulder Canyon site is generally given at upwards of \$30,000,000.

Who Should Build the Dam?

The agency which should carry out the regulation of the flow of the lower river in the interest of irrigation, for the development of power and for flood control should be the United States, but, if private parties are ready to undertake the work subject to such control by federal government and such regulations as may be necessary to properly guard conflicting interests and established rights,

there can be no valid objection to granting such private parties permission to proceed with the work.

In no event should the right to control be passed on to the several states which are interested in the conservation and use of the waters of the Colorado River and its tributaries. It is well enough for the Colorado River Commission, which is now functioning with Mr. Herbert C. Hoover at its head, to define the relative interests of these states in the waters of the river, but despite all that any of these states can do in the matter of putting the water to beneficial use, there will still be a surplus to flow



The Boulder Canyon dam site where a monument of concrete and rock will rise to a height of 550 feet, storing 25,000,000 acre-ft. of water, which will irrigate thousands of acres of arid land, protect the Imperial Valley from disastrous floods and generate approximately 600,000 hp. of electrical energy to turn the wheels of countless industries in Arizona, Nevada and California.

down the river into its lower reaches and the works here under discussion will certainly be carried out in some form.

If the United States undertakes the work, then suitable provision should be made for wholesaling the water to the districts that are irrigated with water that is made available by storage, a fair charge should be made to the power companies who obtain power from this source for distribution, and annual benefits should be assessed against the regions which are benefited by flood control or, of course, there might be an equivalent immediate or early return to the United States of capital investment which could best be accomplished by issuing bonds and turning the same over to the United States.

Should California Reject the Principle of Utility Regulation?

The Former President of the California State Railroad Commission Defends the Present System of Regulated Service which is Endangered by the Proposed Water and Power Act to be Voted on in November

By E. O. EDGERTON
President, East Bay Water Company

ARE we in California about to do a foolish thing? Are we about to sweep aside all the valuable teachings of experience, to disregard the advice of those intimately familiar with the detailed operation of a great industry and instead, with blind faith, to follow those lacking experience and who, proceeding without regard to facts, seek to establish leadership through appeal to the emotions, prejudices and hopes? Are we to jeopardize the foremost position in America in electrical development and with reckless disregard of consequences abandon a demonstrated success for an untried experiment already bearing evidence of failure? Are we to besmirch the honor and draw into question the good faith of the great state of California by deliberately, and for wholly selfish purposes, jeopardizing the honest investment of thousands of our citizens in the power enterprises?

In short, will the people of California at the coming election in November, by popular vote, adopt the Water-Power amendment to the Constitution?

To one who has a knowledge of the conditions in California surrounding the electric industry it is incredible that the state would interrupt, or in the slightest degree impede, the wonderful development now going forward of the electric resources of this state. Without any exaggeration it may be stated that California leads the country in the production of electricity to consumers under the best service conditions and at the lowest rates, with state regulation which, while it gives all of the benefits and economies of monopoly, protects consumers against oppression.

Today we have all of the benefits of stimulated private initiative with complete control by the state to check and prevent the evils arising from the unlimited play of selfish interests.

For ten years now state regulation of public utility power companies has brought to the point of demonstration these things:

Adequate development of hydroelectric energy with proper steam reserve and standby, the most economical transmission of electric energy brought about by the most highly scientific studies and installation of the highest voltage transmission in the world and the distribution of energy not only in congested thickly populated centers but in the great agricultural areas where consumers are scattered and comparatively few in number. The availability of electric energy to practically every established farm and to thousands of acres awaiting development. The production of electric energy in advance of consumption to an extent unprecedented anywhere.

The absolute elimination through regulation of discrimination as between consumers so that today every consumer within a given class of use has the assurance of identical treatment and the smallest and least influential consumer receives precisely the same treatment as the largest and most influential user. The establishment of absolute equality before the Railroad Commission of all consumers.

The production to the consumer of this wonderful service at actual cost, the only profit derived by those who have in good faith invested their money in these enterprises being a moderate interest return on the money put into the properties. The lowest rate for the best service, favorably contrasting with any state in the Union.

The submission to the impartial and intelligent scrutiny of the Railroad Commission of all stock and bond issues and of every important function of the power companies. The exposition in public hearings before that Commission of every intimate detail of corporate management.

The evolution of the attitude of power company management from one of some reluctance to acquiescence in state regulation and a full realization that in complete and effective regulation lies the safeguard and security of the business.

The elevation of the ideals of management of the power companies to the point where today they stand unrivaled as business organizations, dealing on a basis of higher standards and more concern for the public weal than any other class of business.

The successful working out of complete state control of the great electric industry without the stifling of initiative and ambition on the part of management for constantly better results.

The establishment of confidence in these great public utility enterprises on the part of investors to the extent that today, after ten years of regulation, practically unlimited funds are available on reasonable terms for the development of the business.

The complete demonstration that the most interesting and perhaps most important experiment in government—the state regulation of public utilities—is a success.

The most complete information of every angle of the electric business as a result of intensive and repeated investigations by thoroughly trained men so that each forward step may now be made based upon exact knowledge of conditions that exist.

The demonstration that public officials, undaunted by the clamor of the demagogue and in the face of misinformed and misguided public opinion will honestly and conscientiously carry out sound and intelligent measures to preserve to the people the uninterrupted vital service of electric energy and on the other hand the complete submission to state control of the energetic and able men engaged in operating the electric properties.

Advocates Inadequately Informed

And yet today we are asked to conclude that all of the above accomplishments are worthless or evil, that the electric industry under state regulation is a failure and that we now propose to turn for relief to an untried experiment of state ownership and operation of the electric business and to do this at the behest and in reliance upon men who not only have had no experience in the conduct of great electric enterprises but who did not avail themselves of carefully gathered and recorded data before the preparation of this Water Power Act.

It is an astonishing proposition that men would urge the adoption of a constitutional amendment which authorizes the issuance of state bonds to the extent of five hundred million dollars for the purpose of putting the state into the highly complicated and technical business of producing and distributing electric energy, without the most careful and exhaustive investigation, studies and estimates made by competent men.

Applying Simple Business Principles

No responsible business man in his sober senses would so act. Imagine the president of a power company going before his board of directors and seriously proposing a commitment for hundreds of millions of dollars based on his mere assertion that the enterprise would be profitable because another power company in some other part of the state had made profits. He having made no investigation of the conditions under which these profits were made and being without any knowledge of whether the alleged profits were actually earned or whether the total cost had properly been accounted for. Suppose in response to a question of a director he admitted that the entire basis of his judgment that the proposed commitment was wise was based on statements made by men engaged in the power business upon a very small scale and who naturally would be inclined to assert the success of the enterprise for whose management they were responsible.

Certainly a board of directors which would accept such a proposal would be convicted of the grossest inefficiency and bad judgment and unquestionably there is no board of directors today in California of any power company which would not immediately lose faith in its president if he made such a proposal—and yet this is precisely what the proponents of this Water Power Act have done.

A careful perusal of every public argument and of every statement of fact they have made shows beyond question an utter lack of that careful investigation, that careful assembling of data, that careful weighing of this data upon which sound judgment should be based.

What possible justification is there for the gentlemen who are urging the people of California to commit the state to such a tremendous business enterprise and to blindly follow their leadership when they have utterly failed to base their advocacy upon an investigation such as any reasonable business man would make before committing himself?

It is true that these advocates talk principally of municipal ownership and seek to persuade people that this scheme is one merely to help cities finance comparatively small electric enterprises. But the Act itself in precise terms authorizes the state, through five appointed officials, to enter completely into the power business and for that purpose to expend up to five hundred million dollars.

We who have faith in California, who have a profound respect for its history, for the pioneer men and women who created a character for this commonwealth, a character of rugged honesty and practical Americanism—a willingness to advance and progress but only upon established facts and the exercise of business judgment—we, as I say, who cherish the reputation of a forward-looking and progressive but intelligent and sane people cannot convince ourselves that this radical proposal with all that it means will be adopted and that there will be repudiation and abandonment of the splendid achievements already accomplished.

China is Electrical Machinery Market

Peking Hospital Has Completely Electrified Laundry and Kitchen While Other Institutions are Similarly Equipped

WITH washing at one and a half cents a garment there is but little call for washing machines, or any other strictly labor-saving device, in Chinese homes or the homes of foreign residents in China. However, large institutions such as hospitals, are tending to provide an ever-growing market for electrical installations of all kinds, and the recently-opened plant of the Peking Union Medical College Hospital has a large electrically-equipped laundry with electric washers, wringers, driers and ironers



Americans who are used to the ordinary Chinese laundry are due to receive a shock from the modern clothes washing department of the Peking Union Medical College hospital. This institution also has a completely electrified kitchen as well as its own power plant.

which handle three thousand pieces a day. The spacious kitchens, also, are electrified, having even electric egg-beaters and potato-peelers. The institution has its own power house with a generating capacity of 375 kw. which furnishes light and power and steam heat throughout the buildings, and special low-volt current to the experimental laboratories for use with incubators and other equipment. The buildings are ventilated by means of electrically driven exhaust fans. Nitrous oxide and oxygen are pumped direct from the nitrous oxide plant to the main operating rooms. There are in all 153 electric motors in operation and eleven electric generators.

This particular institution, situated in the capital and richly endowed, is of course not an average one, but mission hospitals far in the interior are continually adding electric light, pumps, and X-ray machines to their equipment. As there is no electrical service in many of these outlying districts, the power is frequently generated by a power-light plant owned by the hospital.

While there is a plentiful fuel supply for such engine driven generating units in the cities near the coast, the extensive use of such units is seriously hampered in the interior by lack of such fuel. However, this problem is rapidly being solved.

Denver Proves Illumination is Asset to Civic Beauty

Intermountain City Attains National Fame for Striking Effects Achieved Through Scientific Application of Lighting Principles to Streets and Buildings by Denver Gas and Electric Light Company



Denver's Civic Center is one of the most artistically lighted parks in the country. Indirect and flood lighting have been used to good effect to bring out the beauty of the Cheesman Memorial at night.

The Denver Gas and Electric Light Company has played a prominent part in the spread of the doctrine of illumination as one of the great assets to civic beauty.



A panoramic view of the city from the West Portico of the Capitol Building shows the brightly lighted Gas and Electric building in the center of the business district.



In few fields has the electric sign had greater application than among the theaters. Curtis Street in Denver, better known as "Movie Row," is an example of a small "Great White Way."



The Voorhies' Memorial in the Civic Center is a striking example of flood lighting as applied to public buildings.



The Denver Gas and Electric Light Company has set a high standard with the illumination scheme adopted for its building.



The new Colorado Theater has the appearance of being flood lighted whereas the effect is derived from the two signs alone.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management and Advertising, University of Washington

THE BUYER OF THE GOODS

At the outset of this series of articles on practical salesmanship we found that we had to consider our problem from four specific angles, so now, having discussed the salesman himself, and the goods he is offering for sale, we have to shift our attention to the prospective and potential buyer of our goods.

One of the best definitions of salesmanship which I have ever heard is this: "Salesmanship is the art of persuading people who need certain goods, to purchase them, and this by using means and methods which consume the least time and effort."

The time is not so long past when practical men on hearing the word "psychology" mentioned with reference to their work would get insulted and would denounce the speaker or writer for a hair-brained theorist. At the present moment the use of this word requires either explanation or apology no longer. The fact has become universally recognized that selling is an out-and-out psychological process.

The first psychological factor of a sale to which I want to call your attention lies hidden in the words "people who need certain goods" used in the first part of the definition of salesmanship I just gave.

The Various Kinds of Demand

To buy an article a man must have simultaneously two things, the desire for this article and the means to purchase it. Lacking either one of the two the man cannot or will not buy this article. Having both he will or can buy it, and in this case we speak of "effective demand." Such a case will be illustrated by my wife going to a department store and, having enough money in her purse, requesting the young lady at the counter to give her a spool of No. 50 white cotton thread. Little salesmanship is needed to sell in this instance.

But now, take the case of a woman on whom you call to sell a washing machine. She may know and like your machine from having seen it at the home of some good friend of hers, but she honestly believes that she cannot afford its price. This kind of demand we call the "ineffective demand," and here salesmanship has to step in to raise the intensity of her desire to such a level that she will find a way to "afford" the price of the machine. This the salesman will attempt to do by using the various tools of appealing, persuading and convincing, with the purpose of so affecting her by his psychological appeals that her own instincts will make her place a much higher personal value than ever before on that washing machine.

And, third, there is the case of the so-called "latent demand," the case where a person equipped with sufficient purchasing power does not buy simply because he or she is not aware of the advantages offered in this specific instance, and to him or her personally, by the given article. The task of bringing such "latent demand" to the surface by education and propaganda among people who "should buy but do not" is nowadays mostly accomplished by the various advertising methods used in modern commerce. Nevertheless personal salesmanship in many lines, particularly so in the electrical field, is deeply concerned with the conversion of the latent into effective demand, through so-called "educational salesmanship."

In all these three classes of "demand" the problem which presents itself to the salesman is a purely psychological one of either awakening the non-existent desire, or of so intensifying the insufficiently strong initial desire of the possible purchaser as to induce him to convert mere wish into action.

And, after all, this is really the heart of the salesmanship problem. All the other factors we have been discussing until now were really more in the nature of preliminaries.

Stimulating the Desire

There are several angles from which we have to consider the problem of "persuading people by means and methods which consume the least time and effort."

By what means or methods can we influence people so as to change the intensity of their desire or, in the case of "latent demand," to awaken this desire to begin with?

Second, upon what elements in the personal make-up of people do their desires depend and what factors in our individual psychology control the intensity of our wishes and desires?

And third, what are the various social and individual types of buyers with whom we have to deal, and how does this affect the problem of stimulating or awakening their desire for our product?

The Two Methods of Influencing

There are in use among people in general two widely different methods of transferring thoughts and ideas. We influence people by reasoning with them and convincing them, and on the other hand we influence people by appealing to their instincts and feelings and by suggesting things or actions to them.

The tools of influencing are very different in both cases, and in fact, not everybody can handle

the two sets of tools for thought transfer equally well. The clear, crisp, reliable logician and the suggestive novelist or poet both succeed in transferring their thoughts to us and in influencing our ideas and desires. But it is very rare indeed that the logician can use the methods of the poet or the poet the methods of the logician.

The salesman, though, is supposed to use either method as occasion may demand, and in the measure as he succeeds in acquiring both techniques he will find that his influence on people as a whole becomes more and more effective because then, like a skilled worker, he is at liberty to choose exactly the tool that suits the occasion, instead of being forced to use his single tool under favorable and unfavorable conditions.

Reasoning and Convincing

Used as an exclusive method, reasoning in the sense of logical marshalling of proofs can be applied only in those cases where we deal with highly skilled professional buyers. With unskilled buyers it serves only in an auxiliary capacity.

Reasoning, in its simplest form, implies the use of two proven sets of facts, called premises, the first of which is broad and inclusive and the second narrow and specific, from which a third statement can be drawn forming the conclusion from the two premises.

In actual practice we do not always follow this somewhat stilted form of reasoning, but shorten it by dropping out one or both premises on the tacit assumption that they are too well known to require a restatement at this moment. So we say, in reasoning, "Some day John is going to die." And we are hardly conscious that we simply neglected to state the following two implied premises: (1) Experience has proven that all human beings are mortal; (2) John is a human being; and have gone on to state the conclusion: (3) Therefore John is mortal.

Notwithstanding the apparent simplicity of this process of logical thinking most of the reasoning of people proves faulty, and this for two reasons, first, we frequently assume as proven premises whose truth has not really been demonstrated beyond any doubt; and second, the apparently simple form of conclusion given above is not quite as simple as it looks, as can be seen from the following triple sentence seemingly built up on the same principle: (1) Most trees have green leaves; (2) Our apple tree has green leaves; (3) Therefore most trees are apple trees.

As a practical conclusion it would seem to follow, hard as it is for the busy practical salesman to admit, that if we really want to master the art of convincing with reference to the goods we are trying to sell there are two things which we unavoidably must master. We must learn the true facts with reference to our product, its qualities, performances, uses and advantages. And we must learn at least the rudiments of correct reasoning by studying the principles of the so-called science of logic.

Whenever your buyers are highly trained professional specialists these two things just mentioned

must inevitably form part of your selling equipment, as you can see from the fact that the large electrical manufacturers use trained engineers as salesmen.

But when you sell to the general non-specialized buyers, to the public at large, the straight reasoning method is not really the most effective means of influencing people's desires, because, so psychologists tell us, the motives which impel people to act are not really based on their reasoning but are a consequence of their instincts, customs and habits. And it is these forces which we have to utilize when we deal with the untrained buyer.

Appealing and Visualizing

The next article of this series will be devoted to a discussion of the motives of people in general. Here we must merely recognize that these motives have to be reached by the one open route to the intimate and often unconscious processes of instinct and feeling, the so-called "short-circuit" method of direct appeal through association of ideas and through "suggestion." And the path in the buyer's mind, by which we may open up the active flow of his desires, is usually referred to as his "imagination."

The practical deduction for the salesman who wants to use these powerful assistants discovered for him by the psychologist, who wants to let his goods participate in or benefit by the pleasant feelings which are awakened in people by a number of images familiar to them, is that he has to school himself in both the ability to discover the various "associations" attaching to things and ideas, and the ability to bring about the appearance of these images together with their feeling-colors in the minds of his clients.

There are no set rules and prescriptions which would help anybody to acquire these abilities, so I am able only to throw out a suggestion which, I know, will appear far-fetched and tedious to the majority of my readers. But what does the proverb say? "There is no royal road to knowledge."

Read Good Authors

The best, if not the only way to study the successful methods of appealing to people's imaginations is to watch how people notoriously successful in that line have been doing it and are doing it.

You can go and listen to successful speakers. And when you cannot do that you surely can go to the library and borrow books written by masters of the art of human appeal. And do not think that I am recommending to you the reading only of classical literature. Far from it. I speak of modern good writers. Do not ask me to quote names, because I am not a specialist in English modern literature. One thing is sure, if some author enjoys a good reputation; if his or her stories and articles are printed by our best publishers and continue in popularity for a fair period of time, you can be assured that by studying their methods of appealing to their readers' imaginations you can learn a great number of technical points on the best ways of appealing to the imaginations of your public—the customers to whom you want to sell your goods.

Increasing Production in Industry

Shortcuts in Management and New Power Applications That Have Reduced the Cost of Manufacturing Processes or Increased the Rate of Production.

Ideas and Suggestions by Practical Men.

Auto-Electrolysis as a Possible Cause of Mechanical Failures

By R. C. CHERRY

Asst. Prof. Elect. Engr., University of California

Having noted many articles and many inquiries in electrical magazines within the last months regarding electrolysis, the writer would like to make a report on some observations and recent experiments, and through this elementary report suggest a field of wonderfully practical possibilities.

This research originated some five years ago when in one of the large hydroelectric power plants of the United States Reclamation Service some 200 bearings in the governing system of the water wheels were destroyed past use in less than one year of actual service.

These bearings consisted of hardened steel pins oscillating through a small angle in a plugged bronze bushing and were supposed to be self-lubricating in a spray of water. The motion was not sufficient to overlap the plugs in the bushing and at the end of 245 days of actual use the pins had the appearance shown in Fig. 1. Pins three inches in diameter were reduced one-eighth of an inch.

As an experiment the soft plugs were removed from one of the bushings, the steel pin and the bronze bushing were placed in distilled water and an initial potential of 0.3 volts positive from the steel to the bronze was observed. This potential, however, was increasing rapidly, depending upon quantity of water

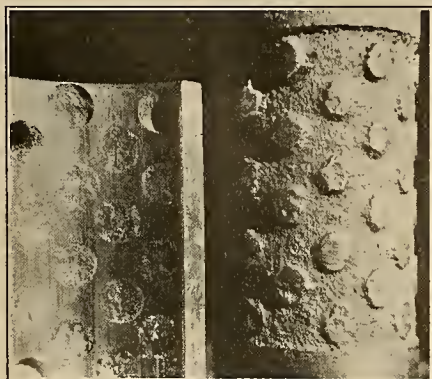


Fig. 1

A bronze water wheel bushing showing the effects of electrolysis after 245 days of use. Two hundred bearings were similarly affected.

used and metal surface exposed, until over 0.7 volts was obtained. When, in like manner, the plugs from the bushings were tested to the steel a potential nearly equal to that obtained with the bronze was noted, but positive from the plugs to the steel. Thus as indicated in

THIS DEPARTMENT

will be devoted to a discussion of practical problems of industrial operation and management. Readers' requests for information will be published in each issue, together with the answers to previous questions. It is hoped that readers will take full advantage of this opportunity to profit by the practical experience of others and to give others the benefit of their own discoveries. Space rates will be paid for answers which are published.

Fig. 2 we find two potentials in series sending current through a circuit consisting of a short path through the steel, the bronze bushing and the plugs, and two films of alkaline water. This current doubtless carried that steel

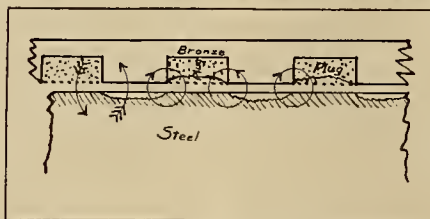


Fig. 2

Diagram showing the direction of potential when a bronze bushing and a piece of steel shafting were submerged in a distilled water electrolyte.

which was opposite the bronze into solution while that which was opposite the plugs was absolutely protected.

Following are a few of many observations of similar action which have been brought to the attention of the writer.

Fig. 3 shows the cross-section of a pipe taken from the chemistry laboratory at the University of California which failed at the point shown after only a few months' use. The pipe was lined with tin and was used to carry distilled water. There was apparently a flaw in the tin lining, and iron being decidedly positive to tin, a current was immediately set up from the exposed iron to the tin, eating out the cavity in the iron as shown until the pipe was eaten through from the inside.

In another instance a large number of steel stud bolts were used to hold bronze stuffing glands on some large valve stems, all being submerged in water in the penstock of a power plant. In about one year's time these bolts, where they passed through the bronze gland, were completely eaten off, dropping the glands.

The steel shaft of a 300-hp. centrifugal pump passed through a bronze

bushing between the rotor of the pump and the stuffing gland. In about one year the shaft was destroyed beyond use where it passed through the bushing and had to be replaced. A bronze bushing of sufficient size not being available, in the emergency a babbitt one was substituted and after some three years' use both the shaft and the bushing were found in excellent condition. Why? That particular babbitt must have been approximately neutral to that particular steel.

There is a multitude of evidence that this inherent potential between elements and through that potential the "Auto-Electrolysis"—if you will allow that term—of those elements, is a vital factor in machine design.

Take the case of bearings that are lubricated with water as one indication.

In the old steel rolling mills, the rolls on account of the heat were lubricated with water and it was early discovered that the most satisfactory bearing was iron on iron. Why? No inherent potential across the bearing.

The thrust bearings of turbine wheels, the stern propeller shaft bearings of ships and many other water lubricated bearings are metal on wood. Why? A non-conductor for one element of the bearing.

Thus, after several years of observation and discussion with designing and operating engineers of wide experience, we believe that this idea of electrolysis is the secret of many mysterious failures and many successes, such as fiber and rawhide gears, the success of which

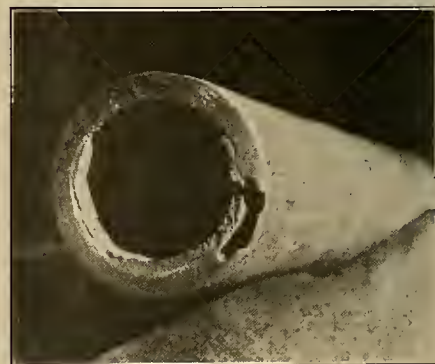


Fig. 3

A piece of steel pipe lined with tin which was used to carry distilled water, showing the effects of electrolysis after but a few months in service.

is evidence that this action is taking place even in the dry state; the success or failure of various paints and protective coatings for exposed metal surfaces, and so on through an almost infinite list down to the success of the jeweled bearing in a watch.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

The Show Exhibit versus the Real Electric Home

Electrical Service League of British Columbia Finds Exhibit Highly Successful in Putting Over Outlet Message

An electrical home exhibit lasting two weeks has recently been held, under the auspices of the Electrical Service League of British Columbia, in connection with a Building and House Furnishing Exhibition, which was promoted by the Vancouver Association of Contractors and Master Builders.

The various branches of the electrical industry pooled their funds to finance the exhibit, which consisted of three rooms of an electrical home in miniature—kitchen, dining room and bedroom.

Particular attention was given to proper illumination and proper wiring for convenience outlets. The B. C. Electric Railway Company, Ltd., Canadian General Electric, Ltd., Canadian Westinghouse Company, Ltd., Northern Electric Company, Ltd., and Horsman and Son (wholesalers) and the Vancouver Association of Electrical Contractors and Dealers sunk the identity of the individual firms in this particular exhibit and no one maintained a separate exhibit. This presented the electrical industry as a single unit to the building public. Under the circumstances, it was necessary in fairness to all the manufacturers and manufacturers' agents financing the exhibit, to determine by lot the particular appliance of each type to be used in the exhibit.

After the lots were drawn each manufacturer carefully covered all marks of identification possible on the appliance he furnished the exhibit. For example, the B. C. Electric Railway Company supplied the range. A placard bearing the legend "Electric Range" covered all name plates carrying the manufacturer's name.

The three rooms of the exhibit were finished and furnished in as attractive a style as possible commensurate with

the buying power of the average man's purse. Great care was taken in the selection of furniture, draperies, and other non-electrical fittings. Each room of the exhibit opened on one side and on the opposite side was a large window looking out apparently on the countryside. Skilfully painted and illuminated "backgrounds" were built by a theatrical scenic artist to maintain the illusion that the spectators were in a room in an actual house looking out of doors on natural scenery.

Every convenience outlet was placarded. Those outlets which were installed waist high, or higher in the walls, carried a card directly above the outlet showing its use. Cards on the walls with ribbons running to the baseboard outlets explained their use and purpose so that no doubt was left in the mind of the spectator as to the purpose of the exhibit.

Illuminated street numbers on the outside pillars of the booths attracted considerable attention.

The cost of operation of each appliance was set forth on small cards placed near each particular appliance so that when the demonstrator was busy the spectator could read for himself the cost of operation of any particular appliance.

No prices were quoted by any of the demonstrators, except in a general way; for example, if a customer asked the price of an electric range he was told that ranges vary in price from \$90.00 to \$300.00 and specific prices and particulars could be obtained from any legitimate contractor-dealer.

Great stress was laid upon proper illumination of the home and it was explained by the demonstrators that fixtures were no longer "just lights" but

today form an essential part of the decorative scheme of the home.

The show ran from 11 o'clock in the morning until 11 o'clock at night for a period of two weeks and it was necessary to employ one man to serve from 11 o'clock in the morning until 2 o'clock in the afternoon and to put the exhibit in proper condition each day. From 2 o'clock in the afternoon until 11 o'clock at night two shifts of three men each handled the booth. These demonstrators were furnished equally by the manufacturers, power company and contractor-dealers represented so that a competent person was always in each room of the exhibit to explain proper wiring and proper illumination, as well as the use of appliances.

By using the representatives of the various companies who contributed to the financial support of the exhibit more interest and support was created within the trade than would have been if paid demonstrators had been employed during the exhibition.

During the exhibition 10,000 pamphlets showing the proper wiring plan for a two-story house, with list of suggested appliances and proper convenience outlets, as well as a short article on the value of proper wiring by competent contractor-dealers, were distributed.

A large number of prospects for ranges and sundry small appliances, prospects for wiring for convenience outlets, and prospects for proper illumination were obtained. The names and addresses of these prospects were turned in to the office of the Service League on cards and a personal letter was written to each person asking for information giving the information desired whenever possible. When the prospect wished information on illumination the illumination engineer of the B. C. Electric Railway Company was sent to interview him after the prospect had been advised by letter that on such and such a date, if convenient for him, the engineer would call and give him the benefit of his experience in home illumination, at no cost.

The central station made no effort to sell either fixtures or wiring, but rendered to prospective customers for energy a very real service.

Range prospects were pooled and given to the manufacturers all at the same time, while prospects for particular appliances were turned over to the manufacturer making the particular appliance after adequate information had been forwarded to the prospect from the office of the Service League.

The electrical home exhibit attracted more attention than any other exhibit in the building and in the opinion of the Advisory Council of the Electrical Service League was a success in every way.



The three-room electrical home exhibit staged by the British Columbia Electrical Service League in conjunction with a "Building and House Furnishing Exhibition" held in Vancouver recently.

Pacific Northwest Has Progressive Contractor-Dealers

Electragists of Portland, Seattle and Spokane Display Marked Ability in Decorating Windows
For the Purpose of Calling the Public Attention to Electrical Merchandise

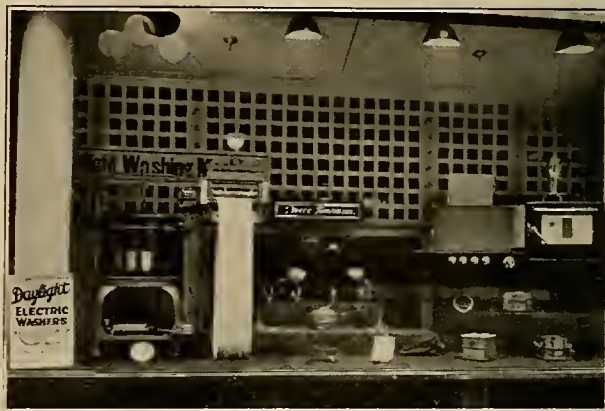


Eleven years ago E. W. Murray, owner of the E. W. Murray Lighting Company, Spokane, started in business with a little shop on a back street. Today he has one of the most attractive and best

equipped stores in the Northwest, covering two floors and extending the breadth of a city block. He bases his success on the continual study and use of better merchandising methods.



There is not a single item in the electrical appliance line which cannot be purchased from the Lushington Electric Company of Seattle, which has as its motto, "Better Service."



Window displays which will sell goods are one of the achievements of the Pierce-Tomlinson Electric Company of Portland, which offers this example as proof of its contention.



Humor can occasionally be applied to a window display without detracting from its effectiveness, as the window of the Electric Appliance Company of Seattle shows. Two well known cartoon characters are used to enhance possibilities of a vacuum cleaner.



Simplicity and good taste have been effectively used in the decoration of this small window by the Poole Electric Company of Seattle. There is no question but what this window carries a greater message than one filled with small appliances.



Speeding Up the Sale of Household Appliances

A Discussion of Some of the Methods Used by Electrical Dealers in Southern California to Increase the Volume of Sales

By CHARLES A. GOODARD

Various and sundry chroniclers have stoutly maintained that "there is nothing new under the sun" but to the enterprising contractor-dealer the quotation means nothing. New merchandising ideas, new methods of interesting the public in the goods to be sold and new schemes to increase sales are constantly being devised. Southern California offers a fertile field for the electricist who is in search of new ideas, for in that section of the West the electrical contractor-dealer has developed into a merchandising expert.

In order to speed up the sales of a certain washer, the A. M. Smith Company of Los Angeles invested in a stock of dinner ware which it offered to early purchasers of the washing machine. Considerable advertising was done calling attention to the offer which was made to the first hundred buyers. Each day the advertising was changed indicating the number of sets which remained to be given away. The one hundred washing machines were sold in a record time due to the added incentive of receiving a simple set of dinner ware.

By getting the cooperation of the children a dealer in one community secured a large list of prospects. Children were invited to come to the store late in the fall to witness the operation of a miniature model of a washer. It was built along the lines of the regular machine except that it was a toy, suited for doll clothes. As a window feature it was a success, for with dolls about in the various stages of doing the washing, the story was complete.

At one side set in a stage to represent a kitchen, with its range, miniature kitchen cabinet and other "scenery," was a doll using the miniature washer, her doll clothes hanging on a line. Opposite was another doll bent over a tub. A card on the second setting read:

"I WISH I HAD ONE OF THOSE ELECTRIC WASHERS! IT'S A SNAP TO DO THE WASHING WITH THEM."

A card beside the doll with the miniature washer read:

"NO TROUBLE AT ALL TO DO THE WASHING. WITH THE WASHING ON THE LINE I CAN GO VISITING ON MONDAY."

During the time when canning is at its height a store that handles a wide variety of high grade electrical devices holds a demonstration in its basement. Here there is plenty of room and here there is a model electrical kitchen fitted up with everything electrical, from iron to range. The demonstrator talks to the women assembled about the proper methods of preserving fruits and vegetables and incidentally refers to certain items of the electrical equipment. A salesman for the store precedes her with a brief talk in which he explains not only the functions of the various equipment, but the cost of operation, the terms on which they are sold and the strong points of his particular

make. He invites any of them to try out the devices. The magnet that helps to draw women is the refreshments served after the talk, during which the women inspect the various devices and ask questions. It means many prospects.

A customer on the books is worth two dozen on the prospect list; so figures one dealer. His business is largely installment, and it is his pride that his sales per customer are not beaten by any in his city. This is due to his treatment of customers who are paying for their devices.

When the bookkeeper sees that only one more payment is to be made, as she enters the present installment, she makes out a card and turns it in to the manager. The plan goes back to the sale of the article being paid for. When the salesman sells the party, say, a vacuum sweeper, he asks questions:

"What other electric equipment have you, Mrs. Wyeth?"

"Nothing but an iron," she says.

"It's great to save labor, isn't it?" he hints.

"Yes, indeed it is!" she agrees. "I'd like to have the house full of it—wish we could put in a washer. Can't now."

Thus when he makes out the order for this party the salesman runs down to a square in the lower corner which says: "Equipment Now Used." Under this head he jots down, "Vac. and iron. Wants washer."

Thus the card which comes to the manager shows that the party will soon be paid out; that she has but a limited equipment and that her payments have been paid right on time. He starts action to keep that name on his books. He has his stenographer send a certain letter to the customer in which he says: Dear Mrs. Wyeth:

I wish to thank you for the prompt manner in which you have handled the account for the vacuum sweeper which we sold you on April 5. By paying for a household device in this manner it is possible to secure one labor-saving device after another and not have to make any big payment while doing so. Your businesslike way of paying this account is appreciated by us.

If you wish, you may select another device and without initial payment go right along paying for it as you have for the vacuum. We are glad to grant you this privilege.

Mr. Sanders tells me that when you selected the vacuum you were in need of a washer. I want you to come in to see our new — Electric Washer. We consider it a wonder. You have seen from your use of the vacuum what electrical equipment will mean to you in saving work. Let me assure you that the washer will save even more work. It removes all of the hard work from a washing, and enables you to finish early in the day—think of that!

Thus this party is slated as a prospect and a salesman sees that she either comes to the store, or that a machine goes to her home to demonstrate. Another customer will be in need of still another piece of labor-saving device and will be written along the same line, but with proper insertions.

Advertising Appliances with the Help of the Church

"Why not make waffles here, bring in some maple syrup, and sell them, too?" suggested F. S. Henderson, local manager at Boulder, Colo., of the Western Light and Power Company, when

the Golden Circle of the local Presbyterian church came to him to get permission to hold a cooked food sale at the company's store and offices. The idea looked good to the church ladies.

It happened that the demonstrator of an electric range was at the Western Light and Power Company at the time. This demonstrator gave her cooperation.

Consequently, in addition to the cakes and other food commonly brought in by the ladies and sold at food sales, there were special and very successful "electrical" features. There were ham sandwiches—the ham being electrically roasted. There were electrically baked biscuits, served hot, with butter and jelly. Besides the waffles and the maple syrup—four or five waffle irons were kept busy—there was electrically prepared coffee.

The ladies washed the dishes in an electric dishwasher.

There were 300 visitors at the sale, which started at 11 a.m. on a Saturday and concluded, all goods sold, about the middle of the afternoon.

News of the success of this food sale, with its electrical features, got out, with the result that the local Episcopal church asked permission to hold a food sale the following Saturday. At this sale, electrically baked doughnuts, biscuits, and a ham were popular articles. This sale cleared about \$100.

The Western Light and Power Company's place of business is not on Boulder's main street, but on a side street. These two sales were held early in the month, when an added advantage would be derived from the many people paying their light bills to avail themselves of the discount. Mr. Henderson, personally, is somewhat doubtful of a food sale held at the store later on in the month. However, "electrical" food sales have caught on so quickly in Boulder that other organizations have asked to hold an "electrical" sale later in the season.

Boulder will probably develop effective methods for such sales. Electrical stores all over the West should encourage these electrical food sales, and they will find that advertising possibilities are unusually attractive. For example, in the making of the waffles, the obvious opportunity is to pick out an attractive young lady, and let her make waffles in the window, in full view of passers-by. Along with the demonstration, a sign in the window, explaining the event and encouraging passers to enter, would pull well, especially on the main streets where so many electrical stores are located.

Because the electrical store finds it easier to make room for a cooked food sale than the grocery store, the hardware store, the drygoods store, and most others, it promises to be sought out by church organizations and asked for the use of a window and floor space for several hours. When such requests come, and the electrical dealer will encourage them, it is a simple matter to sell the ladies on the opportunity to make more money by serving waffles and maple syrup, doughnuts, coffee, etc. The electric dishwasher, for handling the dishes, can be mentioned. The experience of Boulder church ladies can be cited.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Columbia Basin Report Filed Gen. Goethals Recommends Project Be Financed with Government Funds

Favoring the Pend d'Oreille diversion system over the Columbia River gravity system and recommending that the entire Columbia Basin project be financed by the federal government, General George W. Goethals has filed with Dan A. Scott, Washington director of conservation and development, a voluminous report covering his findings with regard to the proposed irrigation project for the Columbia Basin.

The conclusions expressed by the noted engineer regarding the entire project follow:

1—Of more than 3,000,000 acres of land embraced within the Columbia Basin, lying between the Columbia and Snake Rivers, 1,750,000 are irrigable by the Pend d'Oreille gravity project and 1,403,000 by the Columbia River pumping project.

2—The gravity project provides water by gravity flow from the Pend d'Oreille River and its tributaries above Newport.

3—The pumping project provides water from the Columbia River. A pool is formed by a dam, varying from 200 to 285 feet in height, with respective effective heads of 123 to 211 feet across the gorge of the Columbia at the head of the Grand Coulee, from which water is pumped by hydroelectric units, each lifting 1,000 second feet approximately 482 feet, or by direct connected units of equal capacity lifting approximately 450 feet, to an artificial lake, whence the water is carried to the land by gravity.

4—The estimated cost of the gravity project is \$254,170,351, or \$145.56 an acre.

5—The construction is feasible and offers no unusual difficulties.

6—The cost of operation and maintenance for the gravity project is estimated at \$841,450, or 48 cents an acre per annum.

7—The lowest estimated cost for the pumping project is \$223,096,943 or \$159.01 an acre. The difficulties attending the construction are unusual and the pumps proposed have never been built.

8—The cost of operation and maintenance for the pumping project is estimated from \$2,610,275 to \$2,192,605 per annum, or from \$1.86 to \$1.51 an acre, depending upon the height of dam adopted.

9—The gravity plan is recommended for adoption.

10—It is recommended that the entire project be undertaken with a view to completing it in its entirety rather than attempting it piecemeal or adopting temporary construction.

11—The estimated time for completion is six years.

12—The soils of the irrigable lands are fertile and abundant, being in all respects similar to Yakima and Wenatchee Valleys; large production will result from water on the lands.

13—A great variety of crops can be produced, and, due to the excellent transportation facilities, can be carried to the markets of the world.

14—No apprehension need be felt about settlement of the lands after water has been placed thereon.

15—All things considered, the project is justified from an economic standpoint if the land can be made ready for planting at a cost ranging from \$200 to \$275 an acre; at the latter price a profitable return will be secured on the investment.

16—The project, because of the benefits that will accrue to the United States as a whole, is a national one, and as such should be carried

out by the federal government through direct appropriation.

17—Following the existing policy of the government in its irrigation projects, the farmer or land holder should be taxed to amortize the cost of construction. The government should bear or absorb the interest charges, which will be more than repaid through the increase that will result to the natural wealth, affecting industries and products of all kinds over the entire country.

Tacoma Will Build \$300,000 Steam Generating Station

To guarantee the city adequate electrical power next winter, the city council of Tacoma at a recent meeting instructed the city lighting department to construct this summer a steam generating electric plant to operate from steam purchased from the Consumers' Central Heating Company. The plant will produce a maximum of 9,000 kw. The action taken, which will involve expenditure of \$300,000, is considered one of the most important the council has passed upon in several years.

The cost of the steam generating plant will be paid from the earnings of the light department, without issuance of bonds. Immediate steps will be taken to get bids on turbo-generators, boilers and a building to house the equipment, which will be constructed on city property, adjoining the plant of the Consumers' Central Heating Company on Dick Street. Every effort will be made to rush the construction work. The price to be paid for steam to be furnished by the Consumers Central Heating Company, whose prime business is the heating of down-town buildings, is approximately .8 cents per kilowatt-hour, for the maximum price, while a sliding scale of discounts brings the minimum to .56 cents. The city now pays the Tacoma Railway and Power Company .8 cents per kilowatt-hour for steam-generated current, and .66 cents for water generated power.

Seattle Makes 25% Reduction on Off-peak Industrial Power

Industry in Seattle is assured a healthy growth as the result of an ordinance making a 25 per cent reduction in the rate charged for off-peak industrial power, which has been passed by the city council. The new measure provides that "for current used for industrial power purposes the rate for peak hours shall be the same as for commercial purposes, and for off-peak hours the rate shall be 25 per cent less on all loads of twenty-one horsepower or over. The peak-load hours shall be between 4:30 p.m. and 9:30 p.m. For the purposes of enabling the city light department to carry out the provisions hereof, in all loads of 100 horsepower or over the consumer shall furnish and maintain a graphic recording watt meter."

Railroads Spending Millions Union Pacific Starts Program of Bet- terments in Southern California

Much of the \$29,000,000 appropriated by the Union Pacific Railroad for new equipment, short line extensions and improvements during 1922 will be spent in Southern California, according to an announcement made by C. P. Smith, assistant to the general manager of the railroad.

Work will be begun immediately on extending the Santa Ana line from Whittier to Anaheim at a cost of approximately \$2,000,000. The branch will open up a large and rich agricultural territory. The contract for this work has already been let to the Utah Construction Company.

The Los Angeles freight terminal, which is being built at a cost of \$900,000, will be completed before the end of the summer. A contract has already been let for the construction of a \$200,000 terminal at Long Beach in the flood control district, while plans are under way for the construction of a freight cut-off from this terminal in Long Beach to East San Pedro which will eliminate freight traffic along the congested Long Beach water front.

Of the total sum to be expended this year by the railroad company, \$9,200,000 is to be spent for new equipment, much of which will be allotted to Southern California, according to officials. New cars form the bulk of the equipment to be purchased.

Utah Power Company Seeks Per- mit for Large Development

One of the largest water filings made in southern Utah for several years has been made by the Utah Power and Light Company of Salt Lake City, in an application to the Utah state engineer for the use of 5,000 second-feet from the direct flow of the Green River, and also for the storage of 150,000 acre-feet, for the purpose of furnishing power to various points in Utah.

A cement concrete dam 250 feet high and 900 feet long is mentioned in the application as the diverting works. The power house will be constructed in the dam, according to the plans, and therefore no pipe line would be necessary.

Seattle's first radio show, which had been set for the last week in April, has been postponed to either the week of May 22-28 or the week of May 29 to June 3, the change being made at the request of the two big exhibitors who plan to have extensive exhibits, the Radio Corporation of America and Westinghouse Electric and Manufacturing Company.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

Officials in Washington who have looked over the record of the public hearings conducted by the Colorado River Commission in the West are not as sanguine as Secretary Hoover as to the possibility of negotiating a peace treaty between the states of the Colorado basin and securing its ratification by the legislatures of the states and by the Federal Congress. In the opinion of one official at least, there was more discussion of states' rights at these hearings than there was during the ten years preceding the Civil War. With the people in the frame of mind as is indicated by the utterances of their representatives at these hearings, many officials fear that the solution of the problem will have to be passed on to the next generation.

There is a general tendency to commend the appointment of the Commission composed of engineers. After fifty years of litigation, it is admitted generally that the lawyers made a mess of the proposition in which they were assisted in no small degree by the courts, which after all these years have handed down no clear-cut, fundamental decision.

While there is a tendency in official circles to be pessimistic as to the outcome of the present effort to solve the problem, there is no official in Washington connected with reclamation, water power, river hydraulics, or flood-control who does not hope against hope that some prompt plan may be worked out whereby the Colorado may be used to its full value. In a country where water is worth more than land, it is much more lamentable, they say, that a great development like this should be held up for lack of concord than in a proposition like Muscle Shoals, where the development of the surrounding country does not depend absolutely on the utilization of the river's possibilities. In the case of the Colorado where the development of 4,500,000 acres and 6,000,000 hp.—basic resources sufficient to support 67,000,000 people—are in the balance, it is the more regrettable that it is impossible to get the project out of the conversational stage.

The East is only beginning to realize the potentialities of the Colorado. Even yet it is not known generally that the Colorado at times has as great a flow of water as has the Mississippi at St. Louis. Even with its great flow, they do not realize that it would take the entire flow for two years to fill one of the reservoirs that is being planned. There is also the obligation of the nation to the people of the lower Colorado who have been fighting its waters since 1849. They are entitled to Federal aid in the matter of flood-control. The precedent was set several years ago when Congress enacted the flood-control act which made possible the material strengthening of the levee lines along the lower Mississippi. Incidentally, had Congress not taken that action, practically the whole lower Mississippi Valley now would be under water in the face of the combined outpourings of every tributary of the Mississippi,

which, for the first time since records have been kept, are in flood at the same time.

Power Permits Issued

One of the most important licenses which has been issued recently by the Federal Power Commission is that granted to the Southern California Edison Company, covering its \$13,000,000 project on the San Joaquin River in Fresno and Madera counties, California. The primary power available is 112,000 hp. The six large turbines which are to be installed will be capable of developing 195,000 hp. The project works include a concrete arch dam 100 feet high, and a tunnel 21 feet by 21 feet which will be 28,000 feet long. There will be two parallel 220,000-volt transmission lines, one and one-half miles long to a 20,000-kw. power house. This license does not cover an important part of the project which is the construction of a large reservoir on the headwaters of Oak Grove Creek. It will be extended to include that part of the project once the state regulations have been complied with. A preliminary permit was issued in connection with the license to cover a reservoir on the Clackamas River from which water will be diverted into the intake on Oak Grove Creek.

The Southern Sierras Power Company, of Riverside, has been granted a license to cover two developments on Snow Creek and its tributaries in Riverside county, California. The project works in one case include three miles of 18-inch conduit, and a two thousand-kva. power house operating under a head of 868 feet. The power to be developed at these new plants is needed to augment the supply now being furnished to the San Bernardino and Imperial valleys.

A license also has been granted to the Southern California Edison Company covering that part of its proposed power project on the Kaweah River, lying outside the Sequoia National Park. The entire project was covered by the permits granted to the Mount Whitney Power Company by the Department of the Interior and by the Department of Agriculture. The Interior Department's permit covered that part of the project lying within the National Park.

The Southern California Edison Company purchased the rights of the Mount Whitney Power Company and applied to the two Departments for a transfer of the permit. This transfer was approved by the Department of the Interior in August, 1920, but the Secretary of Agriculture declined to approve the transfer granted by his Department on the ground that the passage of the Federal Water Power Act rendered him without authority to act in such a case. The matter was referred to the Attorney General who rendered an opinion to the effect that the matter now comes under the jurisdiction of the Federal Power Commission.

A license has been issued by the Commission to the California Oregon Power

Company, of San Francisco, covering three short sections of a constructed transmission line from Cantella to a sub-station near Delta, Cal., where connection is made with the system of the Pacific Gas and Electric Company. These three sections of line cross lands within the Shasta National Forest.

Preliminary permits have been issued covering two proposed projects on the Little Colorado River. The permits were issued to Frank G. Baum, of San Francisco.

Another preliminary permit has been issued to Mushen and Cronmiller, of Lake View, Oregon, to cover a proposed power development on Deet and Cammas Creeks in Lake County, Oregon. Two power houses developing a total of 800 hp. are to be constructed.

Coal and Iron Mines in Utah Are Inspected by Californians

Wigginton E. Creed, president of the Pacific Gas and Electric Company and the Columbia Steel Company, together with a large party of California financial and industrial leaders recently completed a tour of the Carbon county coal fields and the Iron county iron deposits in Utah.

The tour of inspection followed a conference with L. F. Rains of the Carbon Fuel Company of Salt Lake City and W. W. Armstrong, president of the National Copper Bank of the same city, regarding the establishment of a steel industry in Utah, a preliminary announcement of which appeared on page 441 of the December 1, 1921, issue of the Journal of Electricity and Western Industry. While no positive announcement has been made regarding a merger of the steel, pig iron and coal interests of California and Utah, the fact that the California men have visited the proposed field of operations is taken as indicative of the fact that a definite announcement will be forthcoming in the near future.

It is understood that the proposed plans call for the erection of a 500-ton blast furnace for the production of pig iron on the shores of Utah Lake, the construction of several steel plants, as well as a coke by-product plant, and the development of the vast iron and coal deposits in Utah. Involved in the utilization of the coal and iron ore will be the construction of a branch railroad approximately 25 miles in length from Lund in the direction of Cedar City.

With Mr. Creed on the trip were Joseph D. Grant, director of the Bank of California; Albert E. Boynton, attorney for the Hammon interests of San Francisco; John S. Drum, president of the Mercantile Trust Company of San Francisco and former president of the American Bankers' Association; Louis Sloss, president of the Northern Commercial Company; Joseph Sloss, bank director and merchant; D. H. Botchford, general manager of the Columbia Steel Company; J. D. Fenstermacher, secretary of the Columbia Steel Company, and a number of technical advisers and engineers.

The Oregon-Kalama Lumber Company, recently incorporated with a capital stock of \$500,000, has entered into an agreement with the Kalama (Ore.) port district to erect a sawmill of not less than 100,000 feet capacity per day.

Contractor-Dealers of Oregon Hold Convention

Highly Successful Mid-winter Session Is Featured by a Large Attendance and Presentation of Electrical Home Display

By W. C. HESTON

The eleventh convention of the Oregon Association of Electrical Contractors and Dealers, held at Corvallis, Oregon, March 30 and 31, was featured by the exceptionally large attendance from every district in the state, and the presentation of a four-act playlet, "Domestic Comfort-Electrical," telling the story of a day's activities in a modern electrically equipped home, before a representative audience of architects, building contractors and home owners.

More than one hundred contractors and dealers and members of allied industries gathered for a discussion of important problems of the industry and a continuation of the association's program to further the interests of the members and the entire industry. In

will be taken. It was the consensus of opinion of those representing contractor-dealers, central station operatives, state and municipal authorities and the contracting public that there existed a very urgent need for a state licensing and inspection code and that a satisfactory bill should be drafted as soon as possible.

Following an excellent banquet served in the domestic science tea room of the college, in the evening, President Kerr, of the Oregon Agricultural College, congratulated the contractors and dealers' association and allied interests upon their large attendance and the very evident spirit of cooperation, and stated that he believed this cooperative spirit would not only benefit the members of

in the virtue of patience, but as the cooperative spirit gradually penetrates and permeates the entire industry we rise to that plane of service which places the industry in a position to profit, and serve."

The public meeting held the second afternoon was presided over by State Chairman J. H. Sroufe, who briefly told of the work of the association in the state and then introduced O. B. Coldwell, vice-president of the Portland Railway Light and Power Company. Mr. Coldwell, whose subject was "Public Utility Service," said in substance, "A large part of the future development of the electrical industry rests in the further saturation of the domestic appliance market and the resultant increased power consumption will hasten the day when the entire state will be adequately supplied with power lines."

Dean Stephen I. Miller, after an outline report of the work of the league for the past nine months, in which he stated that the work of the secretary-manager and the field representatives had been devoted to developing group cooperation in the industry and emphasizing to the public the value of proper electrification of the home, gave to the members of the association and visitors a powerful message on the topic, "Cooperative Organizations."

The need for continued cooperative effort in telling the public about the advantages of proper electrification of the home was emphasized by George A. Boring, manager of the Pacific States Electric Company, at Portland. He said, "The ultimate point of contact between the manufacturer, jobber, central station and contractor-dealer, on the one hand, and the consuming public on the other, is the convenience outlet, and insofar as we are able to increase the number of convenience outlets we increase the sales of domestic electric equipment and the consumption of electrical energy."

W. G. Purcell, Portland architect, representing the newly formed chapter of the Association of Building and Construction of Oregon, in a very interesting talk told of the needs of the building industry and of what the Association of Building and Construction, now a nation-wide movement, expects to do for the building industry.

At a Home Electrical supper meeting Friday evening at the domestic science hall of the college, representative contractor-dealers, central station managers and others interested in the promotion of the "Home Electrical" idea, there was valuable discussion of the effectiveness of this means of reaching the public and several electrical men announced that home electricals would be held in their communities this spring.

R. G. Emerson, Oregon representative of the Northwest Electrical Service League, who had called the meeting, outlined the experiences of successful campaigns in California, Cleveland and elsewhere; he also told how the idea was spreading over the Northwest and how the league was endeavoring to aid in the promotion of the electrical idea by means of the homes. There are in prospect for Washington and Oregon this spring from 10 to 20 homes electrical. By reaching from 250,000 to 500,000 residents of the Northwest with the home electrical idea the league and those responsible for the various exhibits will be aiding in the development of



Delegates to the first mid-winter convention of the Oregon Association of Electrical Contractors and Dealers at Corvallis, gathered at this banquet in the domestic science hall of the Oregon Agricultural College, where the sessions were held.

addition to the meetings of the executive committee and the general business meeting, and as a distinct departure from the usual procedure, there was held a public meeting at which problems of the industry as related to the welfare and interests of the general public were frankly discussed.

The playlet "Domestic Comfort-Electrical," which was presented three times for the public in the women's gymnasium of the Oregon Agricultural College, was the first effort on the part of the electrical men to demonstrate to the public by means of a dramatic production the importance of properly electrifying the home. This exhibit carried the electrical message in a powerful manner to three audiences of approximately 600, and marks a new method of reaching the public.

The morning of the first day was devoted to an executive committee meeting followed in the afternoon by a general business meeting. The principal topic discussed at the general business meeting was state inspection of electrical installations. Discussion of a tentative draft of a bill for presentation to the state legislature brought out some weaknesses in the proposed measure and it was decided to refer it back to the committee who drafted it for revision, and for subsequent presentation to a committee representing all interests involved, at which time final action

the industry but the people of the state of Oregon as well. He said, "By meeting together for a discussion of your problems and opportunities and by co-operating to the fullest possible extent consistent with our democratic economic society, the electrical contractors and dealers and allies in the electrical industry can be assured of a steady, legitimate profit and the public can be guaranteed continuing, adequate service."

The feature of the evening was a speech by Dean Stephen I. Miller, of the school of business administration of the University of Washington, and secretary-manager of the Northwest Electrical Service League. Mr. Miller said in part:

"As we move into the new cycle of prosperity it is essential that we have a more complete understanding of the fundamentals of economics. This period while it will have its hills and vales will in general be on the gradual upward trend.

"The means of avoiding over-competition is by lifting the plane of service within the industry to the point where both the members of the industry on the one hand and the public on the other receive the maximum benefit. The electrical man must remember that profitable business requires adequate service and that the public should bear in mind that proper service for them entails a fair profit for the industry.

"It normally requires 50 years, perhaps, for an industry to become stabilized and the electrical industry has not had time to complete this stabilizing process. But it may be possible by developing the spirit of cooperation to further the progress of the industry toward this much needed stability. Cooperative organization is a slow process which should instruct us

the electrical industry to an extent which at present is immeasurable.

George Boring, as a member of the Portland home electrical committee, stated that plans in that city were well under way for a successful home to be held in June. Among others who reported home electrical programs was T. E. Preston, contractor-dealer of Silverton, Oregon, where he will personally exhibit a home during April.

The annual election held during the convention resulted in the re-election of J. H. Sroufe, as president of the state association. It was decided to dispense with the services of a paid secretary and as a result of this action, Frank R. Whittlesey, who has served several years as secretary of the association, has accepted a position as Oregon state representative of the Northwest Electrical Service League, to succeed R. G. Emerson, who has returned to the services of the league in the state of Washington.

The annual golf tournament, in competition for the handsome trophy donated by the Portland jobbers, was won by William Hagge, contractor-dealer of Marshfield, who played golf for the first time in his life, using only one club throughout the game. The much mooted question of who can play the best baseball—the contractors or the jobbers—is still unsettled, at least in the minds of the contractors, who claim they were really the victors, but the umpire, not wanting to see the jobbers defeated two years in succession, called the game a tie.

The convention was held in conjunction with the annual engineering show of the Oregon Agricultural College, and visitors were given an opportunity to see what is being accomplished by the students, and by the college as the most important educational institution in the state.

One of the features of the convention was the unusually large attendance, which was due in no small measure to the wide publicity given it in the newspapers throughout the state through the efforts of R. G. Emerson, Oregon state representative of the Northwest Electrical Service League.

Engineers employed in examining the foundation for the Priest Rapids dam, near Tacoma, have turned the attention of the Northwest to the wonderful hydroelectric possibilities of the site. This will be one of the largest projects in this country and is estimated to cost \$40,000,000.

Intermountain Electrical Men Hold First Session

Rocky Mountain Electrical Cooperative League Sponsors Conference For Discussion of Problems of Electrical Industry

By M. L. CUMMINGS, JR.

Under the auspices of the Rocky Mountain Electrical Cooperative League the first annual conference of representatives of the various branches of the electrical industry in the intermountain states was held at the Newhouse Hotel, Salt Lake City, April 6 and 7. Seventy-six delegates from various sections of the intermountain country, including Utah, Idaho and near-by states, were in attendance. Many of the problems confronting the contractor-dealer, the jobber, the manufacturer, the central station, and the public in general, were thoroughly discussed, and many valuable ideas were exchanged in the spirited discussions which took place.

The first day's morning session was presided over by Edward H. Eardley, manager of the Eardley Electric Company of Salt Lake City, who is also president of the contractor-dealers' association of Salt Lake City.

P. M. Parry, commercial manager of the Utah Power and Light Company, and chairman of the advisory committee of the Rocky Mountain Electrical Cooperative League, delivered an address of welcome. His well-chosen remarks initiated the "get-together" spirit which prevailed among the delegates during all the sessions which followed.

Mr. Parry explained briefly the functions of the Rocky Mountain Electrical Cooperative League, and told of some of the things which it had accomplished during the past year, and what it expected to accomplish in the future. He particularly emphasized the necessity and the advantages of a better understanding of "the other fellow's" situation among the various branches of the electrical industry, and the closer cooperation which will result therefrom. He laid stress on the idea that the general public must also be educated to a clearer knowledge of what the electrical industry has done and is doing for mankind.

Chairman Eardley, who was introduced by Mr. Parry, spoke of the importance of the electrical business, in all its phases, in the world's activities; and of the necessity of such conferences of those directly interested in the industry.

"At no time in the history of the electrical business in these intermountain

states," said Mr. Eardley, "has there been more need for just the series of meetings that have been arranged, than at the present time, and it is my humble wish that they shall be the means of implanting in our hearts the seriousness of the business in which we are engaged."

L. B. Johnson, of the General Electric Company, read an interesting and instructive paper, which included a chart lecture and discussion on the subject of "Fundamentals of Electrical Retail Merchandising." He pointed out how increased sales and increased net profit could be obtained through better merchandising methods.

Among the points brought out by Mr. Johnson were: the necessity of carrying merchandise of high quality; proper contact with the public; advertising; window display; appearance of the store; courtesy of the salesman.

"The Business Outlook" was the subject of a forceful talk by C. E. Arney, Jr., of the Seattle Chamber of Commerce. Mr. Arney spoke of the psychological factor in the business depression through which the country has passed, and stated that the business community as a whole does not realize that the actual conditions which contributed to this depression have passed, and that today the condition is more a matter of the attitude of mind rather than actual conditions.

He pointed out some of the advantages of organization in solving business problems; called attention to the unemployment situation in Seattle immediately after the close of the war, when 40,000 men were thrown out of employment suddenly as a result of discontinuance of shipbuilding. He told of the work being done by the Seattle Chamber of Commerce to relieve this situation—its home products campaign—its national advertising campaign—and how the various schools, churches and business institutions are cooperating in this work, with wonderful results.

The necessity of creating markets at home was emphasized by the speaker. "Organizations like yours," said Mr. Arney, "are capable of doing a great deal of good, provided that they always maintain a broad vision. You have come here to learn of the problems which affect the business in which you are en-



One hundred members of the electrical industry, representing the Intermountain states, gathered at this banquet at the Salt Lake Commercial Club, which was held in conjunction with the first annual conference to

be held under the auspices of the Rocky Mountain Electrical Cooperative League. Problems relative to every phase of the industry were discussed. Similar meetings will be held every year.

gaged. I think it is very opportune that you should give some consideration to the larger problems of building up the entire community, not only in the effect that it will have on your business directly, but for the effect upon the other fellow's business, and the general development of our great western country."

Mr. Arney spoke of the vital importance of the passage of the Smith-McNary bill to the development of the West.

He also urged hearty support for the Utah Manufacturers' Association in the home products campaign which they are about to launch.

The afternoon session, which was presided over by B. E. Rowley, of Salt Lake City, district manager of the Edison Electric Appliance Company, was opened with a well-prepared paper on the subject of "Extension of League Activities and Correlation of Branches of Industry" by P. L. Goddard, who has recently assumed the duties of executive secretary of the Rocky Mountain Electrical Cooperative League. Mr. Goddard summarized the work of the league since its organization, and outlined a program of activities for the future which it is expected will accomplish wonderful results. He pointed out, in a very convincing manner, how the various branches of the industry are dependent, one upon the other, for success. He strongly emphasized the necessity for cooperation and the good-will spirit among the electrical fraternity, and pledged his best efforts in the furtherance of the work of the League.

"Possibilities for an Electrical Exposition" was the subject discussed by R. J. Dinwoodey of the Intermountain Electric Company of Salt Lake City.

Mr. Dinwoodey outlined the favorable results which could be accomplished from an electrical exposition, and urged that the matter of conducting such an exposition in Salt Lake City in October of this year, possibly in connection with the state fair, be given serious consideration.

The sentiment among the delegates present was strongly in favor of such a project, and it was decided that a committee from the league would consider the proposition in detail and report at a later date.

The morning session of the second day was presided over by C. B. Hawley, general manager of the Intermountain Electric Company of Salt Lake City.

Edward H. Eardley, who represented the contractor-dealers' association of Salt Lake at the recent meeting of the National Association in New York, spoke on the subject of "Observations—With National Committee of Contractor-Dealers."

Mr. Eardley explained that the conference which he attended was not the national convention, but was assembled to discuss the subject matter to be presented at the national convention to be held in Cincinnati in October.

The menace confronting the business of the electrical dealer, in the importation of cheap foreign-made appliances, was pointed out by the speaker, when he said:

"In New York today, yesterday, and for the last two weeks it has been possible to buy as fine a finished flat iron as has ever been on this market, for \$10.00 a dozen. They are being sold—a shipload of them, two hundred thousand irons—not only irons, but other heating appliances. If that condition is allowed to go on with our appliance business our wonderful factories will have to close their doors, because we cannot compete with that sort of a condition. Our markets are being flooded with things made

in foreign countries under sweat-shop methods, at a price an American cannot compete with. For my part, I am through buying junk."

"Industrial and Commercial Lighting" was the subject of an interesting paper, which was illustrated by the use of slides, by E. A. Evans of the Salt Lake City office of the Westinghouse company.

Mr. Evans covered his subject very extensively, and by the use of illustrations called attention to the various correct and incorrect methods of lighting stores and show windows. He recommended that the subject of lighting be given more attention in the future, and showed how improved lighting means more business to the store-keeper, more business for the dealer, increased load for the central station, and a better feeling on the part of the public.

The last session was presided over by R. M. Bleak, superintendent of lighting and appliance sales of the Utah Power and Light Company.

H. M. Ferguson, Salt Lake division manager of the Utah Power and Light Company, covered the subject of "The Modern Electrical Home" in a manner which brought out very forcibly the enormous possibilities of developing business for the electrical people through selling the electric idea to the public.

"The home presents today," he said, "the biggest possible field for new work. Lighting, of course, in an industrial way, and the power business, have been particularly well handled. The means of utilizing power have been very well covered, and there is not the same chance for work along lines of that sort because of the development that has taken place within the past few years."

"Heretofore the home has not been a very serious part of the problem. That business has not been particularly attractive, because it formerly meant heavy investment and small earnings. However, with the coming of the various electrical devices the whole problem has changed. The fact that there are so many thousands of homes in proportion to the handful of customers of other descriptions makes it now a very wonderful field to think about and to work in."

Mr. Ferguson called attention to the large increase in customers of the power company who are taking lighting and fuel service, and using more current as a result of more extensive use of appliances.

He emphasized the necessity of electrical men, particularly those who in contact with the public, being fully educated on the various phases of the question before attempting to educate the public or to sell the public the electric idea. He suggested the organization of classes, through the Rocky Mountain Electrical Cooperative League, to be attended by meter readers, wiremen, and such other men as come directly in contact with the public, and where no department heads would be present, such classes to meet monthly or semi-monthly, and take up various subjects under the direction of persons to be selected by the League.

Mr. Ferguson also recommended the appointment of an inspector by the League, whose duties would be to approach the owners of homes in course of construction, or those who contemplated building homes, go over their

plans, advise them as to proper wiring plans, convenience outlets, and point out any defects that might appear. His advice could, of course, either be followed or rejected by the owner.

The program was concluded with an entertaining and instructive talk by H. T. Plumb, of the General Electric Company of Salt Lake City, on the subject of "Modern Electrical Achievements." Mr. Plumb outlined some of the wonderful developments which have been made in the use of electricity, improvements in various apparatus during the past year, and emphasized the "Safety First" idea.

A feature of the convention was the banquet on the evening of April 6 at the Commercial Club, which was attended by 100 guests. Musical entertainment was furnished by a jazz orchestra and a quartet, the guests indulged in singing and attempts at singing, and there was general jollification, good-fellowship and "get-together." E. H. Eardley was toastmaster.

"A complete success," was the unanimous opinion of those in attendance at the first annual conference of the electrical interests of the intermountain section.

It is felt by the members of the Rocky Mountain Electrical Cooperative League that the foundation has been laid for a greater development of the industry, through better understanding of its various phases, and through cooperation of its various branches, to the end that each and every member thereof, and the public in general, will benefit.

It is planned to hold such conventions annually in the future.

Denver Electrical Home Ready For Visitors on May 8

After numerous delays, the first electrical home in Denver is to be opened to the public on May 8, according to the latest report of the Electrical Cooperative league in that city. Originally planned for opening in the winter, it was found necessary and later advisable to defer the opening until a logical date in the spring season. With the proper time having been reached, the advisory committee of the league is reported to have completed all details for the exhibition, which will run until June 4.

H. D. Randall of the General Electric Company and one of the directors of the Electrical Home Building Company, which financed the project, has been appointed to head the committee which will display the home. It is understood that he will be assisted by a major committee of four which will work out the schedules of demonstrations and talks of the guides who will show the house. Present plans provide for two shifts of guides, each shift requiring about nine men.

Considerable advertising has already appeared in the Denver papers, and announcements are being sent out with the May statements of the telephone company and central station in Denver relative to the opening of the home. About 20,000 stickers have also been distributed to the central stations of those communities nearby Denver inviting the customers of those localities to attend the exhibition.

Meetings of Interest to Western Men

Preparations for L. A. Electric Convention Near Completion

Preparations for the 1922 convention of the Pacific Coast Electrical Association affiliated with the N.E.L.A., to be held at the \$5,000,000 Hotel Ambassador in Los Angeles on May 31, June 1 and 2, are proceeding rapidly according to the committees in charge of the event. The convention promises to be one of the most noteworthy in the history of the organization, not only in attendance, but also in the character of the papers and reports to be presented.

In connection with the convention, the committee in charge has issued a statement relative to accommodations at the Ambassador which is intended to dispel the feeling among members of the association that rates at the hostelry are exceedingly high. It is pointed out that the highest rate charged is \$5 per person per day for a double room with bath and twin beds. Meals average \$4 per day. Every facility will be provided for the entertainment of the guests on the hotel grounds. There are golf links, tennis courts and a swimming pool on the grounds.

Herbert Dewes, of the Southern Sierras Power Company, who is general chairman of the convention, has announced the following committees to serve in conjunction with the sessions:

Entertainment Committee

A. E. Baron, Chairman, San Joaquin Light and Power Corporation; L. W. Davis, Westinghouse Lamp Co.; W. B. Sawyer, U. S. Steel Products Co.; D. E. Harris, Pacific States Elec. Co.; W. C. McWhinney, So. Cal. Edison Co.; D. C. Pence, Illinois Electric Co.; J. G. Loomer, Western Electric Co.

Reception Committee

K. E. Van Kuran, Chairman, Westinghouse Elec. and Mfg. Co.; Garnett Young, Garnett Young Company; G. E. Abrogast, F. E. Newberry Elec. Co.; R. E. Fisher, Pac. Gas and Elec. Co.; P. H. Booth, Edison Elec. Appliance Co.; Robt. L. Eltringham, Cal. Elec. Co-op. Campaign; L. M. Klauber, S. D. Cons. Gas and Elec. Co.; Robert Sibley, Journal of Elec. and Western Industry; C. E. Listenwaller, Listenwaller & Gough; A. E. Morphy, So. Cal. Edison Co.; E. O. Shreve, Genl. Elec. Co.; Emmett Britton, San Joaquin Light and Power Co.; E. B. Criddle, The So. Sierras Power Co.; Geo. A. Campbell, Truckee River Genl. Elec. Co.; E. R. Northmore, L. A. Gas and Elec. Co.

Programs Committee

C. A. Kelley, Chairman, The So. Sierras Power Co.; S. J. Lisberger, Pacific Gas and Elec. Co.; J. O. Case, Genl. Elec. Co.; A. R. Kelley, So. Cal. Edison Co.; Chas. W. Walker, Ontario Power Co.; George Armstrong, Electrical World; A. T. Sanderson, Bryant Elec. Co.

Finance Committee

Henry Bostwick, Pac. Gas and Elec. Co.; P. R. Ferguson, The So. Sierras Power Co.

Banquet Committee

George T. Bigelow, Chairman, The So. Sierras Power Co.; J. B. Black, Great Western Power Co.; A. E. Holloway, S. D. Cons. Gas and Elec. Co.; F. A. Leach, Jr., Pac. Gas. and Elec. Co.; M. E. Newlin, San Joaquin Light and Power Corp.; H. L. Harper, Western Electric Co.; C. B. Hall, Illinois Elec. Co.

Out-of-Door Sports Committee

A. W. Childs, Chairman, So. Cal. Edison Co.; K. E. Van Kuran, Westinghouse Elec. and Mfg. Co.; C. C. Hillis, Elec. Appliance Co.; J. W. Burns, So. Cal. Edison Co.; H. H. Courtright, Valley Electric Supply Co.; R. J. Cash, Jr., Gen. Elec. Co.; W. S. Berry, Western Elec. Co.

Registration and Attendance Committee

C. D. LaMoree, Chairman, Clapp & LaMoree; C. E. Spaulding, Gen. Elec. Co.; Leon S. Hese-man, The So. Sierras Power Co.; L. F. Galbraith, Pac. Gas and Elec. Co.; C. H. Thrane, Pac. States Elec. Co.; J. F. Pollard Coast Val-leys Gas and Elec. Co.

Automobile Transportation Committee

P. H. Ducker, Chairman, So. Cal. Edison Co.; H. E. Sherman, Illinois Elec. Co.; C. O. Hutch-ing, So. Cal. Edison Co.; J. C. Rendler, So. Cal. Elec. Co.; J. S. Brittain, The So. Sierras Power Co.

Transportation Committee

Frank J. Airey, Chairman, Pacific States Elec. Co.; J. W. Redpath, Cal. State Assn. of Contrs. and Dirs.; H. M. Sessions, So. Cal. Edison Co.; H. H. Courtright, Valley Elec. Supply Co.; A. B. Vandercook, Western Elec. Co.

Convention Committee

E. P. Markee, Edison Lamp Works; Robin-son Farmer, Cal. State Assn. Contractors and Dirs.; C. E. Young, Pac. Gas and Elec. Co.; W. H. Talbot, S. D. Cons. Gas and Elec. Co.

Hotel Committee

R. A. Hopkins, Chairman, Westinghouse Elec. and Mfg. Co.; H. C. Rice, So. Cal. Edison Co.; E. G. Snow, Pacific States Elec. Co.; J. M. Morris, Westinghouse Elec. and Mfg. Co.

Electric Club Is Organized by Pasadena, Cal., Interests.

The mutual interest of the electrical contractor-dealer and the central station in developing the maximum yearly use of electricity by domestic consumers was recently pointed out by C. W. Koiner, city manager of Pasadena, California, before a recent meeting of the newly organized Pasadena Electric Club. Mr. Koiner stated that his records would show that electric appliances have increased the average yearly consumption from 436 kw-hr. per meter, in 1910; to 1013 kw-hr. per meter in 1921; and states further that he believed that an additional 1,000 kw-hr. per meter were possible if contractor-dealers would seriously push the sale and use of small household refrigeration units. He gave some interesting figures from typical performances of this neglected end of the electrical business, to

show the savings and convenience which would accrue to the public with the uni-versal adoption of this appliance.

R. H. McCormick of the Electric Shop was elected president of the new or-ganization while the other officers elected were vice-president, B. W. Whipple of H. L. Miller and Company; secretary-treasurer, J. C. Jacobs of the Jacobs Electric Company. Following organization meeting, congratulations were wired to Lawrence W. Davis, special representative of the National As-sociation of Electrical Contractors and Dealers, as it was the opinion that his constructive efforts during a recent visit to California were largely respon-sible for the formation of the club.

Northwest League Emphasizes Home Electrification

A continuation of the program of the Northwest Electrical Service League to bring the idea of proper electrifica-tion of the home before contractors and architects was accomplished by means of a joint meeting of the electrical men and those interested in building con-struction at Bellingham, April 12th.

This meeting, which was attended by about fifty, was devoted entirely to the discussion of building prospects in the Bellingham district for 1922 and the importance of having homes properly electrified. R. G. Emerson, a fieldman for the Northwest Electrical Service League, spoke on the subject, "The Electrical Home," stating that the mes-sage which the electrical industry was endeavoring to bring before the general public, and particularly those interested in home building, was that the modern home "requires ample provision of con-venience outlets so that all the various 'electrical domestic servants' can be used to the fullest extent and also that each room may be properly illuminated in accordance with the requirements of that room and the taste of the occu-pants."

Four authorities on hydroelectric de-velopment in California told San Fran-cisco business men what private initiative has done in the upbuilding of one of the state's greatest industries at a recent meeting of the San Fran-cisco Down Town Association. The speakers were John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company, A. Emory Wishon, general manager of the San Joaquin Light and Power Corpora-tion; Mortimer Fleishhacker, president of the Great Western Power Company and M. M. O'Shaughnessy, city engineer of San Francisco who is in charge of the Hetch-Hetchy project.

The United Fuel and Power Company of San Diego has applied to the Cali-fornia State Railroad Commission for an order authorizing it to sell its elec-tric light and power distribution system in the city of Coronado to the San Diego Consolidated Gas and Electric Company. The price agreed upon be-tween the two utilities is given as \$100,000 cash. The sale includes phys-ical properties, privileges, franchises and good will. The San Diego Consoli-dated already supplies Coronado with gas and it is seeking to acquire the electric business by this purchase.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

NATIONAL ELECTRIC LIGHT ASSOCIATION

Annual Convention—Atlantic City—May 15-19, 1922

Clare N. Stannard, the newly elected vice-president and general manager of The Denver Gas and Electric Light Company, entered the public utility business when he was 21 years old and after eight years with various gas, electric and street railway companies, entered the employ of his company's predecessor in Denver as a collector. After 24 years service, during which he went from the cashier's department to that of commercial manager, he has been made the directing head of one of the most progressive public utility companies in the United States. He



C. N. STANNARD

was born in New York state and his first problem was with a bank in Binghamp, but after a year he entered the service of the gas and electric company of that city. Street railway operation then took his attention and after a brief period in the south, he went to Denver where he secured a position with the city tramway company. One year later he went with the Denver Consolidated Electric Company, the forerunner of the present company, which later added the gas and steam heating services of that city. Until his new appointment, Mr. Stannard was secretary of the company and also of the Summit County (Colo.), Power Company. He is an active member of the Denver Civic and Commercial Association and is also treasurer of the Denver Tourist Bureau. He is past president of the Denver Rotary Club and was a delegate to the international convention in Edinburgh, Scotland, last summer.

Claus Spreckels, formerly secretary and treasurer of the San Diego Electric Railway, has been chosen general manager of the lines. Mr. Spreckels' career with the company has been marked by his speedy advancement. At the age of twenty he refused a chance of a college education to become book-keeper with the company, believing that he could learn more of the actual operation of the lines by taking this step. The plan proved to be correct, for in 1911 he was made secretary and treasurer of the company. He succeeds William Clayton in his present position.

B. S. Hughes, chief engineer, Zarembo Company of Buffalo, N. Y., is a recent Los Angeles and San Francisco visitor. Mr. Hughes has been very much interested in looking up electrochemical processes in the West.

Personals

Arnold Pfau, consulting engineer with the hydraulic department of the Allis-Chalmers Manufacturing Company, is a recent San Francisco visitor, having come to the Pacific Coast to visit the Hetch-Hetchy project and be present at the opening of bids for the Moccasin Creek power plant. According to Mr. Pfau his company has just received an order for three 18,000 horsepower turbines for installation in Japan.

Kunihiko Iwadare, president of the Nippon Electric Company of Tokyo, Japan; Genichiro Ahata, superintendent, and L. W. Tucker, chief engineer of the same company arrived in San Francisco recently from Nippon. They will inspect various hydroelectric developments in California before leaving for the East on a business trip.

J. J. Foley and W. R. Newcombe, officials of the Western Electric Company of Chicago, are recent San Francisco visitors. The two are making a tour of various western market centers investigating business conditions.

Arthur E. Rowe, sales manager for the Garnett Young Company of San Francisco, is taking an active part in the San Francisco Forward Movement, which has been organized to promote home building. In an analysis of the situation he has predicted that new building in San Francisco for the year 1922 will be in excess of \$66,000,000.

Harry B. Gear, secretary of the Commonwealth Edison Company, R. F. Schuchardt of the same concern, Britton I. Budd and Harley A. Johnson of the Chicago Elevated Railroad, Frank E. Goodnow of the Public Service Company of Northern Illinois, C. H. Jones of the Chicago, North Shore Railroad, and D. L. Smith of the Chicago Electric Railroad, constituting the Chicago Committee of Electrification, recently completed an extensive tour of the lines of the Chicago, Milwaukee and St. Paul Railroad, and the Butte, Anaconda and Pacific lines. The committee is engaged in the study of various phases of railway electrification before making a report on the proposed electrification of all steam lines operating into Chicago. They were conducted on their tour by R. Beeuwkes, electrical engineer for the C. M. & St. P.

H. J. Gundlach, general manager of the Mine and Smelter Supply Company of Denver and George Lowe, purchasing agent of the same company, recently completed an extensive tour of the manufacturing centers of the East. During the trip they inspected the East Pittsburg plant of the Westinghouse Electric and Manufacturing Company and were also shown the recently completed radio broadcasting station, KDKA, one of the most powerful in the country.

H. S. Lane, former assistant superintendent of electrical distribution in the San Jose district of the Pacific Gas and Electric Company, has been shifted to the San Francisco office as assistant engineer of maintenance. He has been succeeded in San Jose by C. O. Bossemeier.

Frank Bonner, assistant chief engineer, U. S. Forest Service, with headquarters at Washington, D. C., is a recent Pacific Coast visitor, where he spent much time in the Forestry headquarters of the various divisions of the West reviewing the road building situation upon national forest reserves, which he has specially in charge this season.

Max J. Kuhl, counselor of the Industrial Association of San Francisco, was one of the principal speakers before a recent two day conference of industrial experts from twenty-six western cities, held in Salt Lake recently under the auspices of the Utah Associated Industries. Mr. Kuhl described the progress which has been made in the effective installation of the American plan in the Pacific Coast city. Nine western states were represented at the sessions and plans were worked out to perpetuate the conference.

D. H. Braymer, co-editor of Electrical World, has been made editorial and publishing director of Electrical Review and Industrial Engineer, one of the recent acquisitions to the McGraw-Hill publications. He will, however, still act in an advisory editorial capacity to Electrical World.

George Bell, formerly with the California Commission of Immigration and Housing, is today an industrial consultant, performing unusually timely and helpful work for the Industrial Association of San Francisco. During the past year San Francisco has become outstanding among the cities of the Pacific Coast in the progressive way in which the labor difficulties have been adjusted by the installation of the American plan, in all building construction in the bay region. Particularly is this manifested in building activities in San Francisco itself, which today stands



G. L. BELL

forth in building activities, exceeding all records of years past. Mr. Bell as industrial consultant for the Industrial Association is one of those thoughtful workers who is assisting in putting over this new idealism in industrial relations. Mr. Bell was also a member of the arbitration committee which brought about a settlement in the building strike a year ago. On another page of this issue of the Journal of Electricity and Western Industry may be found in some detail his particular ideals along these lines.

George Mattis, former city engineer of Oakland, California, has been engaged by the Key Route to make an extensive survey of the proposed Goat Island terminal on San Francisco Bay. The federal government will hold a hearing in San Francisco in the near future for the purpose of hearing arguments relative to the project.

C. E. Listenwaller of the firm of Listenwaller and Gough, jobbers of electrical supplies in Los Angeles, is in receipt of a postcard from a German firm at Zeitz, Germany, in which the postcard cost two hundred and forty pennings of postage to get the message to him. Charlie is wondering if it cost two hundred and forty to send a postal, how much it would cost to send a letter?

George A. Damon, consulting electrical engineer of Los Angeles, is one of the vice-presidents of the Regional Planning Conference of Los Angeles county which has just completed the second of its meetings. This commission is attempting to solve the zoning, highway, transportation, sanitary, flood control, school and finance problems of the southern California metropolis, problems in which the engineer can be of the greatest help.

S. W. Bishop, executive manager of the Electrical Co-operative League of Denver, Colorado, has recently given a talk before the Wyoming Public Utilities Association, which had its convention in Cheyenne. Mr. Bishop is a powerful leader in the Inter-Mountain District and is doing much good toward the forwarding of the method electrical in Colorado and Wyoming particularly.

Al C. Joy, former publicity manager for the California Raisin Growers' Association, is now publicity manager for the San Joaquin Light and Power Corporation of Fresno, California. Mr. Joy was for many years a newspaper



A. C. JOY

man in San Francisco previous to undertaking the work of making the California raisin famous throughout the world. He was best known as sporting editor of the San Francisco Examiner. Mr. Joy goes to his new office with a wealth of knowledge concerning the up-building of California, especially the San Joaquin Valley. He is an ardent advocate of co-operation and has been a staunch worker in effecting an understanding between the farmer of the "back country" and the business men of the Coast cities.

Robert Sibley, editor of Journal of Electricity and Western Industry, will be the principal speaker before the Technical Section of the Northwest Section of the Northwest Electric Light and Power Association in its annual convention at Boise, Idaho, on June 9th. Mr. Sibley will speak on the subject, "The Failure of the Hydro-Electric Commission of Ontario, Both from Economic and Engineering Standpoints."

H. W. Crozier, manager of the San Francisco office of Sanderson and Porter, while serving as a member of the Board of Alumni Visitors of the University of California, made a proposal to the Mechanics Institute of San Francisco that they donate annually the sum of \$7,500 to the University of California to found a chair to be known as the Mechanics Institute Professorship of Mechanical Engineering. It is extremely probable that the proposal will be adopted and a close union thereby brought about between the University of California and the Mechanics Institute of San Francisco.

E. C. Larue, hydraulic engineer with the U. S. Reclamation Service and one of the foremost authorities on the Colorado River, recently addressed a gathering of Utah engineers in Salt Lake City on the problems relative to the development of one of the West's greatest sources of hydroelectric energy.

John B. Miller, president of the Southern California Edison Company, is at present in New York City on financial business for his company.

Edwin O. Edgerton, president of the East Bay Water Company and former president of the California State Railroad Commission, gave an interesting address before the San Francisco Commonwealth Club recently on the subject of "The Present and Future Needs of the East Bay Cities," in conjunction with a program relative to the future water supply of the cities adjacent to San Francisco Bay.

Lloyd N. Robinson, formerly with Stone and Webster, Inc., is now chief electrical engineer for the Merced Irrigation District which is at present constructing a \$12,000,000 irrigation and power project in the San Joaquin Valley in California. Mr. Robinson is at present engaged in making the preliminary layout for the power house that the district will install in conjunction with the large storage reservoir near Exchequer on the Merced River.

S. L. Sinclair, engineer with the Minidoka Pumping Project of Rupert, Idaho, is a recent California visitor. Mr. Sinclair is spending several months in California in an intensive study of hydroelectric development in the various sections of the state and will take a special course at the summer session of the University of California this year.

C. A. Kofoid, professor of zoology at the University of California and assistant director of the Scripps Institution for Biological Research, has been appointed to a committee of the National Research Council for the purpose of devising protective measures against marine borers. The teredo causes millions of dollars' worth of damage to wharves and other submerged wooden structures in the harbors of the Pacific Coast.

Archibald S. Downey, one of the foremost industrial figures in Seattle, has recently been elected president of the Northwest chapter of the Associated General Contractors of America at a convention held in Portland. Since coming to Seattle in 1899, Mr. Downey has been president of the Seattle Section of the American Society of Civil Engineers, vice-chairman of the industrial bureau of the Seattle Chamber of Commerce, and during the war was chairman of the power plant committee of the Fuel Administration Board for the state of Washington. During the war the construction company which



A. S. DOWNEY

Mr. Downey organized carried out a large constructional program for the U. S. government at the Puget Sound Navy Yard and at Forts Worden, Casey and Flagler. Mr. Downey is a staunch advocate of the policy that men identified with the constructional activities of a community should give unsparingly of their time in the civic and industrial upbuilding of their city.

John L. Harrington, noted consulting engineer of Kansas City, is a recent Pacific Coast visitor and is interested in both the Oakland inner harbor bridge and the Dumbarton bridge proposals which have been receiving such active consideration recently in the San Francisco Bay region.

A. B. West, vice president and general manager of the Southern Sierras Power Company, answered to the classification of "Ice" at the recent Rotary meeting in San Francisco. This is the first time the frigid character of the climate in Southern California has thus been openly confessed.

Warren McBryde, secretary-treasurer of the California-Hawaiian Sugar Company and president of the Industrial Association of San Francisco, is taking an active part in adjusting the present labor difficulties in the San Francisco Bay region.

Paul B. McKee, vice-president and general manager of the California Oregon Power Company with headquarters at Medford, Oregon, is one of those who has substantial part in opening up the famous "Marble Halls of Oregon," as Joaquin Miller long ago dubbed the remarkable caves in Josephine County in Southern Oregon. The wonderful scenic beauty of these caves presents a veritable fairyland to those who have paid a visit to the "pipe organ" and the "twin sister" in the caves.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

There has been a slight increase in the volume of trade during the month, but results have fallen short of expectations, due, in part, to continued cool and rainy weather. Spring ranch work is still delayed, and snow in the mountains has prevented any mining work of consequence.

Carry-over stocks of practically all farm products in the state—including wool, canned goods, wheat, barley and rice—are below normal, and this fact contributed to a strengthening of prices. Advances in the prices of farmer's products, accompanied by moderate declines in various other commodities have been of some benefit to the farmer, and this is reflected in reduced borrowings of country banks.

Building operations for the month reached a record figure for two years, and manufacturing generally is showing slight gains.

Among jobbers in millinery, Spring wearing apparel, electrical and radio supplies, hardware and building materials, trade is fairly satisfactory, but in many other lines the movement is slow, and travelers handling anything that might be termed a luxury, report results disappointing. Collections are slow.

Twelve hundred and fifteen real estate sales in San Francisco for March record a total value of \$13,735,965. These are the largest totals, in number of sales and value, to be recorded in any one month since March, 1906, when there were 1259 sales valued approximately at \$18,250,570. Building is still active with a total operations for the month of \$3,975,241.

The bond market continues strong and active, with heavy buying of Liberties and a demand for the better class of foreign government securities, many of which have touched a new high level. This extraordinary demand for securities is said to represent for the most part true investment support, coming from legitimate outside sources, as distinguished from professional traders and speculators. There has been relatively little profit-taking on the advance and present holders show an inclination to retain securities for income producing purposes.

LOS ANGELES

Utilities are continuing to attract the attention of supply firms and manufacturers by reason of large orders for new equipment and betterments to systems. Street railway transportation companies have placed orders for hundreds of car motors, together with several completely automatic substations.

The city of Los Angeles is rushing construction work on the distributing

lines in order to complete the cut-over of the Edison system recently purchased. Bids for equipment, transformers, and line materials are being called for, many orders having been placed already.

Actual construction work has been started on the 20,000 spindle cotton mill; plans call for the mill to be in partial operation by early fall. The moving picture industry is once more in full operation with more than 100 companies in production work among the studios and surrounding country.

Weather to date continues cool and generally favorable to rapid plant growth but slow maturing to fruit and vegetables, thought to be due largely to the heavy deposits of snows in the mountains from the high Sierras to the Laguna Mountains of San Diego county. At Summit, California, the total depth is reported as 162 inches or more than 50 per cent above the average of several years. Ample irrigation water, water for power and replenishing of underground supplies for wells are the promising aspects of this condition. Local government authorities report the condition as indicative of high-water run-offs and floods on the lower Colorado River when the melt begins.

Bank clearings continue to average 10 to 15 per cent above last year for the same period. Building permits show this activity to be unprecedented, with the total volume hovering around the \$10,000,000 a month mark.

SEATTLE

Statistics compiled after a canvass of construction activities throughout the state, brings to light the fact that more than \$50,000,000 will be spent in the state of Washington this year in new building work. This amount is 30 per cent greater than was expended in 1921. Public improvement work in Seattle and other large cities throughout the state will require the greatest expenditure of funds. It is estimated that more than \$20,000,000 will be spent for this class of work alone. Building construction is second in importance, with highway construction third. Buildings planned or now building in the state, exclusive of Seattle, are estimated to cost approximately \$9,000,000, while structures now building in Seattle will cost about \$6,000,000. Buildings projected for construction this year in Seattle are estimated to cost between \$6,000,000 and \$7,000,000. Highway work planned and under way in the several counties to be completed this year will exceed \$6,500,000, and already the commission has expended approximately \$2,000,000.

In Seattle and the Puget Sound country, nearly all the slack has been taken from the employment situation, and it is believed within the next 30 days, un-

employment will be reduced to a minimum. The demand from logging camps, mills, farms and irrigation districts is daily increasing.

The demand for West Coast lumber has outstripped the productive capacity of the mills, according to the weekly trade announcement of the West Coast Lumbermen's Association. Shipments of West Coast lumber are increasing, the rail movement showing an especially marked increase, indicating that the farming states have come back in the market as the result of the improvement in demand for agricultural products. Nearly every large lumber manufacturing plant in the Northwest is now operating to full eight-hour capacity.

The predicted improvement in weather conditions is reflected in the general increase in retail and wholesale trade in the city, and merchants and dealers are optimistic over the prospects for early spring.

PORTLAND

General business conditions seem to be improving slightly. Lumber production for several weeks past has been nearly normal, ranging from 5 to 8 per cent below normal. Many mills which have been shut down for nearly a year are resuming operations. The weather has moderated so that practically all of the logging camps are now in operation. This together with building construction has very much relieved the unemployment situation. The value of building permits for Portland for March were the greatest for any month in the history of the city. Bank clearings continue to hold up well and port business is good.

Electrical manufacturers' agents and jobbers report business improving materially in the past week or two. Both inquiries and actual sales are active. Contractor-dealer store sales are inactive. Fixtures are exceptionally good, and wiring demands for residence and apartment work are active. Demand for radio equipment continues unprecedented.

The recent gains in the lumber industry are maintained. For the last three months, the orders received have exceeded the output of the mills which holds at better than 90 per cent of normal. For the first 13 weeks of the year, the cut was 1,001,266,834 feet, orders booked were 930,632,791 feet, and shipments were 923,144,556 feet. More inquiry is coming from the agricultural states of the Middle West, and the demand from California is better than at any time since the first of the year. Fair orders are coming from Atlantic Coast points for the better grades.

There is little export demand for wheat, and the slackness of the flour trade has caused many of the mills to close down, while others are grinding

only part time. Shipments in the past month from Portland were 1,513,089 bushels of wheat and 146,191 barrels of flour. Half of the wheat went to Oriental ports.

SALT LAKE CITY

From practically all sources comes the report that business in the intermountain section is improving steadily, although the improvement is slow.

The copper mining industry is gradually resuming its stride, and the lead and silver producers are operating in a very satisfactory manner.

The unemployment situation is becoming less serious, due to resumption in mining activity, and also on account of public improvements which are getting under way. A large road building program is also scheduled, and in some localities this work has started, although bad weather conditions have delayed it considerably. Building activity is increasing and within the next thirty days many new homes will be under construction.

An important event in the electrical industry was the first annual electrical conference held at Salt Lake City, April 6 and 7 under the auspices of the Rocky Mountain Electrical Cooperative League. Many problems of interest to the retailer, the jobber, the manufacturer and the central station were covered in the discussions.

Electrical dealers are pushing the sale of seasonal appliances, such as vacuum cleaners, and in fact the sale of other appliances has improved to some extent. An educational program covering the convenience outlet in the home is one of the activities planned for the future.

Collections are slightly better than for some time past, and bank deposits show healthy increases.

A good year is predicted for the farmers, the wool men and the livestock men.

The general tone is decidedly better. The future looks bright.

DENVER

New building activities are increasing daily. Retail sales in all lines are picking up. The aspect is more optimistic than it has been for the past six months.

From the electrical viewpoint, however, there is a marked concern over the price which is being paid for wiring both buildings and houses. A competitive condition has arisen, especially in the bungalow class of work, where established contractors cannot get the work because of the fearfully low estimates submitted by non-association contractors.

Denver's first electrical home, the annual "Clean-Up, Paint-Up" campaign, and a Better Homes movement are aiding materially in stimulating interest in things electrical.

There are few failures in business reported and money is more liquid at the banks. Constructive developments are planned by a number of electrical firms, and the building of the Moffat tunnel project is practically assured in the passing of the necessary bills by the special session of the state legislature which has just adjourned.

Conditions in Twelfth Federal Reserve District

Current Summary Shows Improved Banking Conditions While Activity in Building Operations and Lumber Mills Are Striking Industrial Developments of Past Month

The monthly report on business and agricultural conditions issued by John Perrin, chairman of the board and Federal Reserve Agent of the Federal Reserve Bank of San Francisco, indicates several tendencies of the past month which will have a salutary effect on business in general. The Twelfth Federal Reserve District includes the states of California, Washington, Oregon, Idaho, Utah, Nevada and Arizona. A summary of the report follows:

The banking situation in this district continues to improve. Borrowings from the Federal Reserve Bank of both city and county member banks combined fell from \$61,106,000 on March 8th, to \$49,025,000 on April 12th, a decline of \$12,081,000, or 19.7 per cent. This reduction was accomplished at least in the case of the country member banks at a season of the year when the requirements of their customers are usually heavy, and indicates a growing ability on the part of these banks to meet customers' needs without securing outside assistance.

The most striking industrial development in recent weeks is the record activity in building operations. Figures of building permits for March were, in point of value, the largest figures ever reported in this district exceeding the previous record month of October, 1921, by 17.5 per cent. Compared with the month of March a year ago, this year's figures exhibit an increase of 47.9 per cent in value and 14.7 per cent in number, indicating a period of unusual activity in construction lines during the summer and fall.

Lumber and Mining

Among other industries of the district lumbering is most active. Production during March was approximately 90 per cent of normal, the highest percentage reported by this industry in the past 16 months. New orders received by mills in the four principal lumber associations were 22.4 per cent greater than March production. Five more of the largest copper mines in the district have announced the resumption of operations and on April 1st eleven of the fifteen principal mines which closed down one year ago were again working their properties, although on a greatly curtailed scale. Sales of electric power for industrial purposes in February continued on the same high level as in January, primarily reflecting the activity in lumbering and mining.

Agriculturally there have been few developments during the month. In many sections the winter season extended well into March and farm work has been delayed for two to three weeks. The winter wheat crop now appears to be in better condition than on December 1st, but it is not expected that the record crop of last year (78,000,000 bushels), will be equalled. The present outlook for the deciduous fruit crops of the district is excellent, with the exception of apricots, the yield of which has been reduced as much as 60 per cent in some sections by attacks

of brown rot and killing frost. Preliminary estimates of cotton and sugar beet plantings indicate a slight increase in acreage of cotton in the principal growing sections and a reduction of approximately 25 per cent in the acreage of sugar beets, compared with last year. Prices of agricultural products, while they have not continued the steady gains which characterized their movement in the first two months of the year, have fluctuated at levels appreciably higher than those of January 1st.

An increased demand for unskilled laborers, partly seasonal and partly due to greater productive activity in the district, has increased the number of men employed, and all states report that the peak of unemployment has apparently been passed.

Retail and Wholesale Trade

Trade at retail during the month was 6.2 per cent less in value than in March, 1921, but the comparison loses much of its significance when it is remembered that Easter buying occurred in March last year and will be largely reflected in April sales this year. After making due allowances for declines in retail prices of from 5 to 10 per cent over the year period it is probable that the physical value of business in March, 1922, was at least equal to that in March, 1921. At wholesale, trade in general was dull, and did not compare favorably with 1921 figures either in value or physical volume of sales.

Debits to individual accounts in 20 principal clearing house centers were only 6 per cent less than in March, 1921. This is approximately the same percentage of decline as in the wholesale and retail trade during the year period, and if allowance be made for a smaller amount of income tax payments in March, 1922, than in March, 1921, it would appear that the volume of business represented by these debits was greater in 1922 than in 1921. Business failures in March were greater in number and, with the exception of January of this year, greater in amount of liabilities than in any other month during the present readjustment period.

Denver Is Experiencing Record Breaking Building Boom

With the building permits for the month of March breaking all records for the past twelve years with a total of \$1,573,450, construction activities for Denver during 1922 are expected to reach the record total of \$20,000,000, according to officials of that city. The highest total in the history of the city, July, 1909, with its \$2,240,000 in permits, is expected to be passed before the present year is ended.

The number of permits issued totaled 605, of which 218 were for homes. The volume of building in this and other types of smaller structures is indicated in the fact that but one large permit was issued, that for the L. R. Steel building, which will cost \$300,000.

The Elwell-Parker Company, Cleveland, manufacturers of electric industrial trucks and tractors, has developed an improved type charging plug for electric battery driven trucks. The new device incorporates several new ideas in design, chief among which is its interchangeability.

The Arrow Electric Company, Hartford, Conn., is issuing a small bulletin called "The Outlet," which purports to carry "inside information for the jobber's salesman." Written in a humorous vein, the bulletin carries some pertinent information for the members of the electrical industry to whom it is addressed.

The Edison Electric Appliance Company, Chicago, announces a new Hot-point automatic heating pad to meet the increasing demand for this type of appliance. The pad is ten inches in diameter, and weighs one pound. Several new ideas have been incorporated into its design.

Travis Welch, 180 New Montgomery street, San Francisco, has been appointed western agent for the Beverly Lights Corporation of Providence, R. I., manufacturers of a line of unique ornamental lighting fixtures.

The Electrical Specialty Company, Inc., factory distributors with offices in San Francisco, announce the removal of its offices and stock rooms from the Underwood Building to 75 Fremont street. New and larger quarters will permit the company to better handle its growing business.

The Manhattan Electrical Supply Company, Inc., New York, manufacturers of electrical specialties, announces the placing on the market a new radio headset designed to meet the demands which have developed in this line during the past few months. The headset is super-sensitive and has a sanitary headband.

C. J. White is opening an electrical supply store at Ocean Blvd. and Parker Avenue, Long Beach, California.

Payne Dean Limited, New York City, manufacturers of electrically controlled valves, have issued bulletin No. 100-A, describing the various features of Dean control. The valves are applicable to both steam and water systems.

The Westinghouse Electric and Manufacturing Company, East Pittsburg, has perfected a new tumbler water heater which is designed to heat a small quantity of water quickly and efficiently. The heating element is inserted in copper tubing bent to furnish a large heating surface. The heater is designed to operate at 350 watts on a circuit of 110 to 120 volts.

The Wagner Electric Company, St. Louis has issued a bulletin entitled "Light for Motion Picture Projection," which describes the progress which has been made in this phase of illumination as well as sets forth the many features of the Wagner White Light converter unit.

The Uehling Instrument Company, Patterson, New Jersey, has issued bulletin No. 112 describing the company's carbon dioxide equipment for checking and reducing stack losses in fuel operated power plants.

G. F. Roberts and A. H. Roberts have opened a new store at Garfield and Ramona Blvd., Ramona, California, where a full line of electrical supplies will be carried.

Manufacturer, Dealer, and Jobber Activities

T. S. Halverson has opened a new electrical supply business at 212 East Second Street, Pomona, California.

Robert A. Bosch has opened an electrical supply store at 928 Geary Street, San Francisco, California.

The Electric Heating and Manufacturing Company, Seattle, is preparing to market a new type of heater to be known as the "Circo-Flector." It is the type known as a reflecting electric radiator and radiates heat in all directions. It has a capacity of 660 watts and operates on a voltage ranging from 100 to 120. It weighs but four pounds.

The Illinois Electric Company's Los Angeles branch has announced the purchase of a block of property at Boyd and San Pedro streets where a modern warehouse and offices will be erected as soon as plans are completed, according to C. B. Hall, local manager. This is the first step in a program of expansion in the Southwest territory. The new building will have more than 35,000 sq. ft. of floor space with provisions for future additions.

E. A. Robertson of the Maloney Electric Company of St. Louis, manufacturers of transformers, has announced that he will shortly make an extended trip through Mexico, visiting practically all of the large cities for the purpose of investigating the trade situation in the southern republic.

O. E. Crites, sales manager for the Sheridan County (Wyoming) Electric Company, has resigned to take over one of the Colorado districts for the Hoover vacuum cleaner.

The Central Electric Supply Company has been organized in Denver with a capitalization of \$15,000 by E. V. Beck and others. The offices of the new company will be located at 315 Colorado Building.

The Diamond K Electric Shop of which F. Karbe is proprietor, has opened a new electrical supply store in Riverside, California.

The Sprague Electric Works of the General Electric Company announces the completion of a new narrow-unit, safety type panelboard, which possesses all of the features of regulation-sized boards. Tumbler type switches are one of the features of the new board.

The Westinghouse Electric and Manufacturing Company has announced several changes in the personnel of its western branches which include the appointment of J. R. Deering as office manager of the Los Angeles branch. H. S. Walker has succeeded M. E. Lanning as promotion manager in the Denver office.

The F. W. Wakefield Brass Company of Vermilion, Ohio, manufacturers of lighting specialties, announces considerable increases in business since the beginning of the new year. Output since the first of January is about 100 per cent above the same period last year.

William Thomas is reported to have opened a new store carrying a full line of electrical supplies at 7740 Santa Monica Blvd., Hollywood, California.

The Ward Leonard Electric Company, Mt. Vernon, New York, has placed on the market a new vitrohm radio battery charger for use on a 110-volt direct current line. The apparatus is furnished with a reliable ammeter and a six-foot extension cord with separable plug.

C. W. McNeill and R. C. Surface have established a contractor-dealer business to be known as the Liberty Electric Company at 322 No. Santa Fe Avenue, Pueblo, Colo.

The H. E. Gleason Company, Seattle lighting fixture manufacturers, has moved from 1517 Second Avenue to 418 Union street, where new and larger quarters will enable the company to better care for its growing business.

The Pacific States Electric Company, Pacific Coast jobbers, has recently taken on the line of Red Spot lighting specialties manufactured by the F. W. Wakefield Brass Company of Vermilion, Ohio.

The Poindexter Supply Company of Denver has installed a printing department especially for the issuance of its lighting fixture catalogs.

The Trumbull Electric Manufacturing Company, Plainville, Conn., has placed on the market a new line of externally operated clip type "C" switches, 30 to 200 amperes, 250 to 500 volts. The switch represents an addition to the company's safety type, machine made switches. Circular No. 53 describes the product.

The Condit Electrical Manufacturing Company, Boston, announces the manufacture of a new type oil circuit breaker known as D-22. The device has been designed to meet the increasing demand for a higher interrupting capacity switch of common frame and construction. The circuit breaker is rated at 2000 amperes at 15,000 volts.



THREE MUSKETEERS

If Dumas were called upon to name the paraphernalia with which these three gentlemen are equipped he would utterly fail. The gentleman who is attempting to emulate "Babe" Ruth with the big stick is J. H. ("Harry") Sroufe, Portland contractor-dealer, and president of the Oregon Association of Electrical Contractors and Dealers. But "Harry" cannot play ball. R. G. Emerson, field man and publicity expert for the Northwest Electrical Service League, who is next to him, and F. R. Whittlesey, secretary of the association, can vouch for that. Messrs. Emerson and Whittlesey are not holding overgrown golf balls.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC NORTHWEST

EUGENE, ORE.—Ground will be broken shortly after May 1 for the new plant of the Eugene Farmer's Creamery to cost \$50,000.

CORVALLIS, ORE.—The city council is considering plans for the enlargement and improvement of the municipal water system, the work to cost \$100,000.

HOOD RIVER, ORE.—The Emry Lumber and Fuel Company has completed plans for a new concrete resaw, planning mill and box factory plant which will be two stories high.

HOQUIAM, WASH.—Work of electrifying the plant of the Carlisle-Pennell Lumber Company at Carlisle, and installing a monorail system for handling lumber, which will be started immediately, will cost about \$250,000.

PORT ANGELES, WASH.—The Washington Pulp and Paper Company, as the result of an exceptionally good year, has announced that plans are being prepared for the construction of an additional paper plant at its mills here.

CHELAN, WASH.—The Chelan Irrigation and Power Company has been formed by 30 business men of Chelan. The construction of a power plant on Railroad Creek, which will supply power to the district at reasonable rates, is proposed.

LA GRANDE, ORE.—The George Palmer Lumber Company has announced a program of extensive improvements for its mills in this district which include the construction of ten miles of railroad and the construction of two large bridges.

SEATTLE, WASH.—The city council has passed a bill providing for the construction of a permanent steel bridge across the west waterway at West Spokane Street, to cost \$500,000. The Board of Public Works is now calling for bids on towers, piers, etc., in connection with the work.

SEATTLE, WASH.—Contract for the proposed \$350,000 five-story fireproof orphanage to be built for the Sisters of the Sacred Heart, Seattle, has been let to Scherer & Carlson, contractors, 111 Pine Street. The building will be 230x70 feet in size, modernly equipped throughout.

PORTLAND, ORE.—The Oregon Washington Railroad and Navigation Company plans the construction of a bridge across the Columbia River between Willard and Hedges which will cost approximately \$1,500,000. Other improvements to the lines of this company during the Spring will bring the total expenditure up to \$3,500,000.

WALLA WALLA, WASH.—Contract for the construction of the proposed new twin reservoir by the city of Walla Walla, as a part of its new water system, has been let to the Pacific Coast Paving Company of Tacoma, on a bid of \$176,841. The reservoir will have a capacity of 15,000,000 gallons, and the work involves 70,000 cubic yards of excavation, and 4,000 cubic yards of concrete.

ABERDEEN, WASH.—A \$1,000,000 corporation for the establishment here of a plant for the manufacture of furniture and fixtures for sea-going vessels, and more especially to manufacture a patent table and a patent bed for use on such vessels, filed articles of incorporation recently under the name of the Marine Equipment Company. Incorporators are A. Bullinski, A. F. Gross, William Mattis, et al.

CHEHALIS, WASH.—Immediate installation of a \$15,000 standard street lighting system has been approved by property owners, and the council plans to proceed with this work immediately.

SEATTLE, WASH.—The Union Bridge Company, Central Building, Seattle, has completed plans for a proposed \$250,000 toll bridge to be built across the Pend d'Oreille River at Newport, Washington. Construction of the proposed bridge will be financed by Spokane, Newport, Sandpoint, Priest River and other towns in Washington and Idaho. The Inter-State Toll Bridge Company of Priest River, Idaho, Peter Young, is promoting the project. The general plans for the structure provide for a bridge 1250 feet long, of steel construction, resting on concrete piers.

THE PACIFIC CENTRAL DISTRICT

EUREKA, CAL.—A tanning extract plant eclipsing in size any in this portion of the state will be constructed here by Fred S. Blair at a cost to exceed \$75,000.

TRUCKEE, CAL.—Filipic Brothers have announced that a new ninety room hotel to care for winter visitors will be erected here this summer at a cost in excess of \$125,000.

RICHMOND, CAL.—The Luning Mineral Products Company, manufacturers of paint pigments, intends to treble the capacity of its plant at Twenty-first and Chanselor Avenue.

FRESNO, CAL.—The Southern Pacific Co. has announced that it has leased the property adjoining the depot to the F. H. Buck Packing Company for the erection of a packing house.

SAN FRANCISCO, CAL.—A building permit has been issued to Kincannon and Perego for a \$100,000 six-story and basement reinforced concrete apartment house to be erected at 159 Sutter Street.

YUBA CITY, CAL.—An appropriation of \$70,000 has been made by the Sun-Maid Raisin Growers Association for the erection of a packing plant in this city, according to Harry Piper, local manager.

YUBA CITY, CAL.—The Pacific Gas and Electric Co. has announced that a new substation to cost \$70,000 will be erected here to supply power to Sutter County. It will have a capacity of 2,000 hp.

WATSONVILLE, CAL.—Plans have been completed by C. M. Gay and Son of Los Angeles for a \$180,000 refrigerating plant to be erected here for Stephen Seurich. The building will be of reinforced concrete and steel.

TERRA BELLA, CAL.—The Richgrove-Jasmine Citrus Association has been incorporated here for the purpose of constructing a \$50,000 packing house at Richgrove. Frank Daybell is chairman of the board of directors.

RICHMOND, CAL.—The Decoro Manufacturing Company has purchased a site at the corner of Nevin and Second Streets, for the erection of a factory. Plans are being prepared, according to C. S. Renwick, an official of the company.

SAN FRANCISCO, CAL.—R. S. Browne has received a building permit for the erection of a six-story and basement apartment house at Post and Mason Streets to cost \$200,000. Plans have been prepared by T. Patterson Ross, 310 California St.

LODI, CAL.—Turner & Dahnkin, operators of a chain of motion picture theaters throughout central California, have announced that a new theater will be constructed in this city at a cost of \$100,000. The theater will be of brick, 60 by 120 feet.

SAN FRANCISCO, CAL.—A building permit has been issued to the Walton N. Moore Drygoods Co., for an eight-story and basement reinforced concrete wholesale drygoods house at Mission and Eighth Streets, to cost \$380,000. The Foundation Co. has the general contract.

REDLANDS, CAL.—J. H. Strait & Co., shippers of deciduous fruits, has announced that plans have been prepared for the erection of a 20-ton dehydrator for handling apricots, peaches and apples. It is planned to have the plant in operation by the opening of the fruit season.

STOCKTON, CAL.—Bonds will be voted on May 2 for \$1,300,000 for the erection of a dam on the Calaveras River for a municipal water supply. Also for \$125,000 for the extension of police and fire alarm systems and \$50,000 for the construction of a bridge over Mormon Channel.

MODESTO, CAL.—Riverbank has been chosen as the site for the Santa Fe Railroad's new ice plant for stocking refrigerating cars. Over 600 hp. in electric motors will be installed, necessitating the erection of a new substation by the Pacific Gas and Electric Company, which serves this district.

SACRAMENTO, CAL.—Plans are practically completed for the \$500,000 hospital to be erected on L Street by the Sutter Hospital Association, comprised of forty-five local physicians. Frederick H. Meyer of San Francisco is the architect. The new hospital will include every type of modern equipment.

REDDING, CAL.—W. H. Sampson has appeared before the supervisors for franchises to run power lines in Shasta County in conjunction with a hydroelectric project which he proposes to undertake in this county and in Trinity County at a cost in excess of \$3,000,000. July 6 is the date for selling the franchise.

SAN FRANCISCO, CAL.—The Pacific Gas and Electric Company has announced a reconstruction program in Stanislaus county totaling \$300,000, which includes a new 60,000-volt line from Modesto to Hughson, new substations at Hughson, Riverbank and Turlock, and the installation of new switching equipment at the Modesto substation.

BAKERSFIELD, CAL.—Construction of a pre-cooling plant to cost \$1,500,000, building of a railroad seven miles long from Edison on the lines of the Southern Pacific Company, and the intensive cultivation of 3,400 acres of vineyards, are disclosed in a \$4,000,000 development plant proposed by the De Giorgio Farms Company, of which Joseph De Giorgio is president.

THE INTERMOUNTAIN DISTRICT

FALLON, NEV.—Bids will be received until May 2 by City Clerk Grace Wildes for a pumping plant for the municipal water system.

OGDEN, UTAH.—Water supply from the city wells will be increased 50 per cent through the installation of an air lift system which comprises two 50-hp. motors, two compressors and an air receiver. The equipment will be installed on six of the city wells.

LOGAN, UTAH.—Improvements are being planned to the lighting system on Fourth North Street and Main Street as a result of a petition to the city council.

BOISE, IDA.—The state bureau of highways has completed plans for a three-span, all-steel bridge to be erected over the Clearwater River at Spaulding at a cost of \$91,000.

MISSOULA, MONT.—Construction of a modern apple packing plant at Woodside is being contemplated by the Equity Growers and Shippers Association, according to E. M. Gerer, who says that the plant will be equipped with a modern conveyor system.

STEVENSVILLE, MONT.—The board of directors of the Bitter Root Irrigation district proposes to bond the district for \$1,000,000 for the complete rebuilding of all flume work, the repair of the Lake Como reservoir and the construction of an office building and warehouse for the district.

BUTTE, MONT.—The Northern Pacific Railroad will expend approximately \$700,000 during the coming year for the installation of electric block signals on its lines in North Dakota, Montana and Washington, according to J. S. Kemp, general agent in Butte. A total of 562 miles of lines will have the signals installed.

THREE FORKS, MONT.—The Three Forks Irrigation District has been formed for the irrigation of 20,000 acres of land between here and Willow Creek. Plans are being made for the construction of a dam 120 feet high at the junction of Norwegian and Willow creeks. Willis Buttleman, Ray Matter and H. F. Nelson represent the new district.

DENVER, COLO.—Construction will begin July 1 on the half million dollar Patterson Building, according to Architect Fred E. Mountjoy. The building will be ten stories high and will be constructed of sandstone and brick. Special features will be refrigerating plant for furnishing ice water, and a thermostatic control for heat in all of the offices.

BONNERS FERRY, IDA.—H. H. Hughes, manager of the city water and light plant, has started work on the Moyie Falls power plant with a gang of twenty men. The plant will have a capacity of 550 hp. with provisions for the installation of another similar unit as soon as the demand is sufficient to warrant it. The first unit will cost approximately \$25,000.

DENVER, COLO.—The C. S. Lambie Construction Company has been awarded the general contract for the construction of the \$350,000 garage for the Super-Service Motor Association, according to J. R. Noland, manager. The building will have three floors and a basement and will house approximately \$75,000 worth of modern machinery for the repair of motor vehicles.

SALT LAKE CITY, UTAH.—H. R. Waldo and B. A. MacKenzie, both of 1309 Walker Bank Building, the offices of the Telluride Power Company, have filed applications with the Utah state engineer for the use of water for power purposes in the southern end of Sevier County, Mr. MacKenzie's application is for 15 second-feet of water from Fish Creek for the generation of 1,200 hp. under a head of 1,182 feet, while that of Mr. Waldo is for 100 second-feet from the Sevier River for the development of 900 hp. under a head of 240 feet.

THE PACIFIC SOUTHWEST

SAN BERNARDINO, CAL.—The city engineer is preparing estimates for the 300 white-way posts which it is proposed to erect on E Street between Mill and Highland Avenues.

LONG BEACH, CAL.—A 12-story hotel and office building will be erected at the corner of American Avenue and Broadway for Edward John, according to plans of W. Horace Austin. Traction elevators, vacuum system, refrigerating plant and special wiring for office equipment are some of the features of the specifications.

SAN DIEGO, CAL.—A new store and office building will be erected by Ed. Stricher, merchant, at 745 E. Street. The building will be of brick with ornamental front and will cost about \$25,000.

SAN PEDRO, CAL.—Sixth Street between Pacific Avenue and Harbor Boulevard is to have a Novolux installation or ornamental lighting, according to ordinances which have been passed by the city council.

RIVERSIDE, CAL.—Thirty-three one-light concrete standards will be erected on Locust Street according to the announcement of the city clerk, as part of the improvements now under way for this street.

ORANGE, CAL.—The Standard Oil Company will build an office and warehouse building, together with several large storage tanks, at West Walnut and North Cypress Streets. The cost is estimated at \$25,000.

LONG BEACH, CAL.—A stock company is proposed by J. M. Eaton for the purpose of erecting a 12-story hotel and apartment. Option has been secured on the property at Ocean Boulevard and Marine Way.

LOS ANGELES, CAL.—The Citizen's Independent Ice and Cold Storage Company are to build an addition to their present plant on Rio Street, according to plans now being prepared by the architect, John E. Kunst.

GLENDALE, CAL.—Colorado Boulevard will have an ornamental lighting system between the intersections of Grand Boulevard and Central Avenue. Five-light iron standards have been adopted for this installation.

AVALON, CAL.—Additions to the city water works system in the way of motor-driven pumps and piping together special fittings are contemplated in the call for bids by the city clerk. No estimate of the cost is announced.

PHOENIX, ARIZ.—Building activities have taken a big jump up in the last few months. During March, \$384,558 was the total value of permits and the projects planned call for that much more during the months to follow.

SAN DIEGO.—Muehleisen Tent and Awning Company have started the erection of the new building to house the business of the firm at 1050-54 Second Street. The plans call for brick stores at an estimated expense of \$40,000.

SAN DIEGO, CAL.—Contracts for the six fire-proof barrack buildings at the naval training station were awarded to Lange and Bergstrom of San Diego and Los Angeles, at a figure said to be \$487,000. Work will start at once.

LOS ANGELES, CAL.—The Union Pacific Railway has secured 200 acres at Hobart for the purpose of building a freight terminal and switching yards. Ultimate plans call for the expenditure of \$6,000,000 for shops and terminal facilities.

SANTA BARBARA, CAL.—The new Bernhard Hoffman residence will cost \$90,000. The contract has been awarded to Snook and Kenyon, with offices in this city. Building is of hollow tile and will require six months to construct.

SIERRA MADRE, CAL.—Property owners are completing the petitions for the installation of ornamental lighting on West Central Avenue. The system is estimated to cost \$1,200 when complete. G. T. Farman is chairman of the committee.

COMPTON, CAL.—Robert L. Jones, superintendent of the Compton Electrical Specialties Company, is authority for the statement that his company will expend \$22,500 on a two-story factory building to be erected on North Wilmington Street.

LOS ANGELES, CAL.—Architect Aleck E. Curlett is completing the plans for the 13-story building to be erected for the Sun Realty Company. The contract for the steel frame has been awarded to the Llewellyn Iron Works. Other bids are to be received for the balance of the work in the immediate future.

ANAHEIM, CAL.—The Union Pacific Railway will build stations at Fullerton and Anaheim in connection with the extension of its line from Whittier to Santa Ana. Plans will be under the direction of the engineering department of the railway.

LOS ANGELES, CAL.—The Los Angeles Gas and Electric Company will erect a fire-proof building at the corner of Duncommon and Jackson Streets to house new compressor equipment. The structure will be of steel frame and trusses and is estimated at \$60,000.

SANTA ANA, CAL.—This city and Anaheim will join in the necessary expense for providing large additional capacity to the outfall sewer system. More than \$500,000 will be expended by the two cities in new sewer mains and a new flow line to the ocean.

PHOENIX, ARIZ.—Architects Lescher, Kibbey and Mahoney are preparing the plans for a \$30,000 school and auditorium building for the city of Ashfork, Arizona. They are also supervising architects for the new \$40,000 school building at Prescott, Arizona.

YERMO, CAL.—H. V. Shraven of Salt Lake City was awarded the contract for the Union Pacific depot at a price of \$35,000. The plans include hotel facilities and freight storage rooms. Plans are under the supervision of John Parkinson of Los Angeles.

PASO ROBLES, CAL.—The Almond Growers Association of the city have contracted with Jas. L. McLaughlin of San Francisco for the erection of the new packing house. Construction is to be of reinforced concrete and will cost \$34,000 exclusive of equipment.

LOS ANGELES, CAL.—C. A. Fellows was the successful bidder for the contract covering the 75 miles of main-line double-tracking for the Santa Fe Railway east of Yampai, Ariz. The price is said to have been \$8,000,000, and will require twelve months to complete.

LOS ANGELES, CAL.—A five-story club building and auditorium will be constructed for the Friday Morning Club. Plans are being prepared by architects Allison, Allison and Allison. The building and furnishings are expected to cost in the neighborhood of \$300,000.

SAN BERNARDINO, CAL.—One hundred and fifty thousand dollars will be the cost of the new hotel to be constructed on E Street near Third, according to the announcement of C. B. Phillips who has purchased the 92 feet frontage at the above location. The building will be four stories high.

LOS ANGELES, CAL.—Architect Sam Heiman, with offices in this city and San Francisco, is preparing plans for the new 12-story building to be erected on Spring Street between Sixth and Seventh for Dunn-Williams of San Francisco. The structure is to be of steel frame with terra cotta facing.

ARROWHEAD LAKE, CAL.—McNeal Swasey and H. C. McAfee of Los Angeles have been commissioned to prepare plans for 100 cottages of one, two and three rooms each to be erected at Camp Fleming. A lodge building will also be constructed. The improvements were authorized by R. S. Turner.

LOS ANGELES, CAL.—The I. W. Hellman interests will erect a 12-story office building to cost \$1,500,000 at the corner of Seventh and Hope Streets. The top floors are leased to the Union Oil Company of California. The structure is to be of steel frame, and the general contract is in the hands of MacDonald and Kahn.

FRESNO, CAL.—San Joaquin Light and Power Corporation have received permit from the Federal Power Commission for the development of the North Fork and the West Fork of the Kings River in California. This is part of the \$50,000,000 program which this company has planned and on which much construction has already been undertaken.

Journal of Electricity and Western Industry

25 Cents a Copy

May 15, 1922

San Francisco

Premier

A dirt absorbing, wax running cleaner - in every home. It saves time and work.

THE MARK THAT MEANS INSPECTED & CERTIFIED by PACIFIC STATES ELECTRIC COMPANY

Quality Electrical Merchandise

Chosen from the Markets of the World

Premier

Actually removes quantities of heavy dirt from rugs you thought were clean.

Switch

on only
as by
of the
it a
he arm.

G-E CONVENIENCE OUTLETS

Every room should have at least two! The most modern and convenient way of attaching electrical appliances.

ective window
is one of the
al contractor-
best assets—
high powered yet
give salesman

PACIFIC STATES ELECTRIC COMPANY

San Francisco Los Angeles Oakland Portland Seattle Spokane

Intelligent effort in win-
dow dressing capitalizes
for contractor-dealers
the tremendous adver-
tising values of the
"Check" Seal campaign



TRIANGLE

ARMORED CONDUCTORS
AND
METALLIC FLEXIBLE CONDUIT

SINGLEWALL
NON-METALLIC FLEXIBLE CONDUIT



TRICORD
A REAL HARD SERVICE CORD

QUALITY PRODUCTS

Three Complete Coast Stocks

Pacific Coast Distributors

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

A McGraw-Hill Publication

Founded 1887

ROBERT SIBLEY, Editor

VOLUME 48

SAN FRANCISCO, MAY 15, 1922

NUMBER 10

Contents

EDITORIALS	373
New Vision of the Pacific Coast Electrical Association—Reduce Costs of Government or Prepare for Disaster—Radio Direction Finder as an Aid to Navigation—Who Should Pay for Highway Development?—The California Cooperative Marketing Associations—Need for Research in High Tension Insulators—Regarding Power Company Advertising—A New Service to Western Industries.	
EXPERIMENTING WITH ELECTRICAL TRANSMISSION AT 224,000 VOLTS — by H. Michener, Chairman	380
Report of the Sub-committee on High Voltage Apparatus	
INDUSTRIAL HEATING INSTALLATIONS SHOW SATISFACTORY RESULTS — by Elbert Kramer, Chairman	383
Report of the Industrial Heating Committee	
INCREASING THE USE OF ELECTRICITY FOR COOKING AND HEATING — by F. H. Woodward, Chairman	385
Report of the Committee on Electric Heating	
WHY CITY STREETS AND HIGHWAYS SHOULD BE BETTER LIGHTED — by Geo. T. Bigelow, Chairman	389
Report of the Committee on Street and Highway Lighting	
HOW MUCH SHOULD CONSUMERS BE CHARGED FOR ELECTRIC SERVICE? — by E. B. Criddle, Chairman	392
Report of the Rate Research Committee	
PROBLEMS IN THE STEAM GENERATION OF POWER IN THE WEST — by R. C. Powell, Chairman	397
Report of the Prime Movers Committee	
WESTERN HYDROELECTRIC DEVELOPMENT MEETS SPECIAL PROBLEMS — by F. O. Dolson, Chairman	400
Report of the Hydraulic Power Committee	
RELAY PROTECTION FOR ELECTRICAL APPARATUS IN WESTERN USE — by G. H. Bragg, Chairman	402
Report of the Relay Sub-committee	
CAN WIRELESS BE OF PRACTICAL SERVICE TO WESTERN BUSINESS? — by R. C. Denny, Chairman	406
Report of the Sub-committee on Radio Communication	
SOME UNDISCOVERED MARKETS FOR ELECTRICITY IN ILLUMINATION — by W. L. Frost, Chairman	407
Report of the Committee on Selling Illumination	
PROVIDING FOR ACCURACY IN POWER COMPANY METER RECORDS — by W. R. Frampton, Chairman	409
Report of the Meter Committee	
FACTORS IN REDUCING COSTS IN UNDERGROUND CONSTRUCTION WORK — by R. Roy Cowles, Chairman	414
Report of the Underground Systems Committee	
CHOICE AND MAINTENANCE OF APPARATUS TO MEET WESTERN NEEDS — by L. J. Moore, Chairman	418
Report of the Apparatus Committee	
Western Comment on Current Events.....	376
Letters to the Editor.....	378
Builders of the West — A. B. West.....	379
Pacific Coast Electrical Association 1922 Convention.....	391
Expansion of Waterwheel Runner and Coupling Electrically for Fitting on Shaft.....	396
Eliminating the Waste in Industry.....	420
Western Dealer, Jobber and Agent.....	421
Activities of the West.....	424
Meetings of Interest to Western Men.....	428
Manufacturer, Dealer and Jobber Activities.....	429
Personals	430
Business Outlook in Western Market Centers.....	432
Construction News and New Industrial Developments	433

PUBLISHED SEMI-MONTHLY BY

McGraw-Hill Company of California — Rialto Building — SAN FRANCISCO

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.

WASHINGTON, Colorado Building
CHICAGO, Old Colony Building
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, 10th Ave. and 36th St.

McGraw-Hill CO., Inc., New York
Publishers of
American Machinist—European Edition
(Published in London)
Electrical Review and Industrial Engineer
(Published in Chicago)
Chemical and Metallurgical Engineering
American Machinist Ingenieria Internacional
Electrical World Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation Engineering News Record
Coal Age Electrical Merchandising Power

Subscription rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1922, by McGraw-Hill Company of California. Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation.
Printed in U. S. A.

You want this

AS this advertisement is being written the final touches are being given to the Crawford Electric Plan—a common-sensible, practical program for merchandising the Crawford Electric Range to your customers.

Into the plan goes all the sheer power and persuasiveness and carefully timed effort that we have been able to devise and prove. The range will sell without any plan, but in keeping with our intention that every step connected with its manufacture and sale shall be as new and as sound as the range itself, we have prepared this campaign to move ranges in volume for you.

By the time this advertisement reaches you, the plan will be ready for presentation. It will be laid before you as soon and as fully as you can be reached by our Pacific Coast representative in person. It will command the attention of your chief executives, and, we sincerely believe, their co-operation and high enthusiasm.

YOUR inquiry addressed to Mr. Burton Y. Gibson, at 680 Folsom Street, San Francisco, will enable him to lay the plan before you at once.

WALKER & PRATT MFG. CO.

BOSTON

Crawford ELECTRIC RANGE

DISTRIBUTED BY

Western Electric Company
INCORPORATED
Offices in All Principal Cities

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 10

SAN FRANCISCO, MAY 15, 1922

Per Copy, 25 Cents

New Vision of the Pacific Coast Electrical Association

FOR some years now the trend of electrical thought in the West has been toward the broadening of the activities of association effort. This found expression some time last fall when the Pacific Coast Geographic Division, N. E. L. A., broadened its name into that of Pacific Coast Electrical Association but maintained its affiliation with the National Electric Light Association. At the time the name was changed a committee was appointed to revise the constitution of the former geographic division and to make recommendations for adoption at the forthcoming convention in Los Angeles at the Ambassador Hotel, May 31, June 1-2. It would seem that a number of outstanding things should be interwoven into this constitution. While it is well that the status of membership upon all committees should be broadened so that membership may be drawn from the four branches of the industry—manufacturer, jobber, contractor-dealer and central station—still it must be remembered that the central stations themselves contribute the bulk of the funds wherewith the effective work of the society is carried on. As a consequence, the two main offices, that of president and vice-president, should always be chosen from among central station men. Again, while membership from other branches of the industry should be represented upon the Public Policy Committee, still the chairman of that important committee should always be a central station man. On the other hand, the Executive Committee—the working unit that sets in motion the vast energies of this association—should be equally representative of all branches of the electrical industry. An important

new grade should be created, namely, that of associate member of the Pacific Coast Electrical Association. An associate member would not necessarily have any status in the national association. Such membership should admit to the association under proper recommendations, employees of municipal plants. It should also admit certain classes of local manufacturers, jobbers and electrical contractors and dealers by the payment of a fee far less than that required for national status. Finally, some by-law or new article in the constitution should be introduced whereby authorization is given for the holding of regional meetings throughout the territory covered by the Pacific Coast Electrical Association in order that the twenty-two hundred members which comprise this great organization may the better benefit by their membership in the organization. The activities of the association in the past have of necessity reached only the leaders, and the great body of membership has felt its helpful influence in only exceptional instances. The dividing of the territory of the Pacific Coast Electrical Association into five or six regional districts and the holding of regional meetings every three or four months wherein helpful papers and activities are put into play will make the association a real power, not only in the high influential circles but throughout the rank and file of our industry in the West. With all these new things carefully embodied in the forthcoming constitution to be adopted at the convention in Los Angeles in June, it may well be said that the new year for the Pacific Coast Electrical Association is the most auspicious in its history.

Reduce Costs of Government or Prepare for Disaster

“OUR taxes are too high for the people's present means, local taxes as well as state taxes. We have established pretty nearly all the comforts and luxuries that the Government can furnish but with the present costs of marketing, the people are having difficulty in meeting the cost thereof. I don't know how a sentiment can be created to stop any further expansion of government until actual disaster has compelled the people to see the wisdom of leaving a little of the tax money in the pockets of the people themselves.”

That is the opinion of one of the foremost economic authorities in the country on government finance and taxation as expressed in a letter to the Journal of Electricity and Western Industry.

The people of several of the western states are very much alive to the present situation, and have sensibly set about to remedy matters before actual disaster occurs. Objecting to the increasing tendency of salaried groups of self-perpetuating officials to fasten upon existing, and to create additional, branches of governmental activities and to use every possible avenue of publicity at governmental expense for broadening and increasing the importance of their positions, tax payers' leagues are endeavoring to cut the overhead costs of government by eliminating numerous offices and commissions.

Patriotic and well-meaning citizens endeavoring to cure the evil of the continually growing cost of government will find themselves opposed by strongly entrenched bureaucrats who are prepared to meet just such assaults. Perhaps it will take strength

gained from the knowledge of impending disaster to bring success to the crusaders. It has been said that once public opinion is aroused, results obtain therefrom. At the present time there seems to be surprising unanimity of opinion among business men that costs of government should come down. Economists say that they must come down. It will be interesting to see if they do.

Radio Direction Finder

As an Aid to Navigation

SOUNDING and signaling devices have been employed for many years as aids to navigation. Unfortunately during fog or thick weather when the greatest need for aids to navigation exist, they fail to serve their purpose adequately. Light does not penetrate fog and sound signals are extremely unreliable and cannot be depended upon to indicate direction or distance, and under the most favorable conditions are limited to comparatively short distances.

The Bureau of Standards has given a great deal of attention to the practical development of methods and devices and particularly to the development of a suitable instrument for use on shipboard by means of which direction or bearing of signaling stations may be determined by the use of radio. A method has been perfected wherein lighthouses and light vessels whose location on sailing charts are accurately shown, are equipped with radio fog signaling devices, which automatically transmit characteristic messages during fog or at such times as may be necessary. A direction finder is then required to be installed on shipboard, and the navigating officer can take bearings at any time desired on one or more of the fog signaling stations. So successful have been the results of recent tests that it is predicted that within a short time every important lighthouse and light vessel will become a radio fog signaling station, and the radio direction finder will become as much a part of the ship's equipment as the magnetic compass. An extremely effective aid to navigation will thus be provided which, if universally adopted, will result in more adequately protecting life and property at sea.

Who Should Pay for

Highway Development?

IT has been estimated that there will be expended within the United States during 1922, by the Federal government, the states, counties and municipalities the sum of one billion dollars for highway purposes. These purposes include carrying and amortization charges on outstanding highway bonds; expenses for the administration of highway departments; maintenance of highways; construction of new highways; reconstruction of wornout highways; and the regulation of highway traffic. The West will contribute a larger per capita share of this expenditure than the rest of the country, due both to its immense distances, rugged country, and enterprising spirit.

The question of who will shoulder the burden of highway development is a pressing one. No one

questions the economic necessity and value of a far-flung network of stronger and better highways, although there is a strong feeling that the funds should be wisely and economically expended. What is of special importance is the attitude assumed by many law-manufacturers who maintain that highway improvement confers special and exclusive benefit upon the motor vehicle owner, and who insist that he should bear the entire burden of highway financing.

Prior to the era of the motor vehicle, millions were expended upon road improvement, for which animal-drawn transportation was never charged a special tax. When the multitude of special advantages which accrue to the general public through the presence of highways, are tabulated it would seem unfair to charge the auto owner for more than a part of the total bill. The general public whether he be an owner or non-owner of a motor vehicle, by virtue of the highways is benefited by lower transportation and distribution charges, by comfort and convenience of travel, by increase in land values, and other indirect benefits.

With these facts in mind, the recent decision of the Motor Vehicle Conference Committee, composed of representatives of all branches of the automotive industry, seems fair and logical. This committee has definitely taken the stand that the aggregate amount of excise taxes and all other forms of special impositions levied on the motor vehicle should in no case ever exceed the amount of money needed to meet current expenditures, embracing the maintenance of the highways, regulation of their use, and administration of the highway departments.

The California Cooperative

Marketing Associations

THE attention of the nation has been focused on the agricultural situation in California during the past few years. In the face of a precipitate decline in the value of practically all farm products, which has prostrated whole states and sections, the farmers of that state, with a few exceptions, weathered the storm and in some cases were apparently unaffected by falling prices. Needless to say, widespread interest has been aroused as to how this has been accomplished. It is generally attributed to the "cooperative associations" of that state, and much impetus has been given to the formation everywhere of cooperative organizations alleged to be founded on the "California Plan" by producers of all kinds of farm products, as a result of this advertising.

To say that the various cooperative farm marketing associations of California have been entirely responsible for the present solidity and comparative prosperity of that state is not altogether true. It is true, however, that they have been of tremendous assistance. The cooperative idea is not new, especially in the marketing of farm products. In some parts of the country organizations of similar aims, but different methods, have failed.

There is no cut and dried "California Plan," because no two organizations are entirely alike, ex-

cept that they have applied business methods to farming and fruit raising, by group action. What the California cooperatives have done, is to hire trained men at good salaries to transact certain business affairs for them in practical and economical ways. They have not changed distributive methods, but have utilized existing means, and in some cases improved upon them by eliminating risk. Therein lies their success. They are neither altruistic, nor idealistic. They seek no special privilege, class legislation, or subsidy. Their way has been hard, and the history of the cooperatives is full of battles, but they have fought intelligently. They have sought to better the condition of their members, to gain a greater reward for their work, by education, goodwill and improved business practices rather than by agitation, political appeals to prejudice, and legislative devices.

These facts should be borne in mind when a cooperative organization is formed on an alleged "California Plan." There is no universal cooperative panacea for the ills that beset the farmer. Intelligence, work and education are the time-tried, standard remedies.

Need for Research in High Tension Insulators

IN certain localities in the West where it is necessary that high tension transmission lines parallel the seacoast there is need for research in insulator designs calculated to minimize troubles arising from collection of salt upon wires and insulators. The salt which in such cases is deposited by wind-carried spray reduces the dielectric strength of the insulator, and presents a troublesome problem especially in regions where cleansing rains are infrequent. Although the great high tension lines of the West are largely untroubled by sleet and snow storms, in regions such as the Salton Sea and the Great Salt Lake, or districts where there are similar surface deposits of alkaline material, wind storms often deposit salt in sufficient amounts to cause trouble for the electrical engineer.

Due to the ever increasing voltages at which electrical energy is being transmitted, and since alternative routes to those along seacoasts and over deserts are not available, this problem is yearly becoming more urgent. The desirable degrees of over-insulation should be established as well as designs calculated to prevent or minimize the difficulties. Insulators which may be quickly and inexpensively cleaned and tested are also preferable from an operating standpoint.

Regarding Power Company Advertising

IN reply to a consumer of electric energy, who questioned the necessity of a power company using newspaper advertising in territory where competition is not a serious factor, the State Railroad Commission of California held it to be the most effective and cheapest form of salesmanship. The consumer objected to the cost of the advertising

being charged to operating expenses and "thus collected back from the rate payers." The commission in a letter to the consumer said in effect that competition has nothing to do with this class of advertising. Modern advertising is creative—it produces demand and brings new business. Its use is universal in industrial and commercial life. By producing volume it leads to quantity production and to lower prices. Much of the best national advertising is almost exclusively directed to this end. Merely taking trade away from a competitor without developing new business is a quite negligible feature of modern advertising.

The class of advertising referred to, it was held, is not only legitimate but very desirable, as it is designed to increase the total sales of electric energy by stimulating use. At the present time with the development of hydroelectric power, an expanded market is necessary to utilize this energy. In stimulating additional uses of electricity through effective advertising, the company by increasing volume decreases the cost to each consumer.

A New Service to Western Industries

IN discussing the most pressing problems facing industry in the West, a well-known authority has made the following comment:

"Whether due to diffidence or failure to apprehend the facts, reference is rarely made to the great need for improvement in the management and direction of the operations of many of our manufacturing corporations. I venture to say that if tests of efficiency as severe as those applied to mechanics at the bench or machine were applied to the superintendents and managers of numerous industrial enterprises, **helpful apprenticeships in management** might be among the needed changes resulting."

Economists and business men agree that the nation is embarking upon an era of competition, which, it is predicted, will be more severe and exacting than any previous period.

The success of a business enterprise will be dependent upon the sagacity and competence of superintendents and managers.

The Journal of Electricity and Western Industry is announcing on another page in this issue a service designed to assist manufacturers in eliminating the waste in industry by conducting a clearing house where economies of production and operation which have been effected are discussed by a leading engineer. A production engineer or executive is apt to keep in touch with the development of his own particular business, but his hardest problems may have been solved by an entirely different industry, of which he is probably not aware. "Eliminating the Waste in Industry," the new Journal service, will furnish a cross-section of industry in the west, and will inform the wide-awake executive and engineer of the latest developments in factory management, production economies, personnel relations, salvaging by-products and materials, standardization and similar topics.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

That the Federal government is the only agency that can financially carry the proposed Columbia Basin Irrigation Project to completion, is the substance of

Report of Gen. Goethals on the Columbia Basin

a voluminous report recently submitted by Major General George W. Goethals to the state director of conservation and development of Washington, after a survey

and study of the proposed undertaking. The project embraces the reclamation and irrigation of some two million acres of land, the cost of which is estimated to be \$254,170,000. The engineer recommended a diversion to the Pend d'Oreille river and the construction of a gravity system, to be constructed over a period of six years, rather than by lifting the water from the Columbia river, a method previously advocated. The magnitude of the sum involved makes it impossible that it be financed by investment houses in the usual manner of irrigation projects, states the report, and the Federal government is the only agency that can absorb the interest charges and give the farmer the time necessary to repay the capital. It was suggested that the revolving fund of the Reclamation service was inadequate to do this and that the only logical method of financing the undertaking was by direct appropriation of Congress.

Whether or not California will vote \$500,000,000 at the November election to undertake the development of water and power under state ownership is a mat-

Will California Vote State Power Bill?

ter of vital concern not only to that state but also to the country as a whole.

This proposed experiment based on the plan of the Hydro-Electric Commission of Ontario is one which would affect not only the electrical industry of California and of the nation, but also have a very material effect upon the general industrial progress in California. Accordingly, any reliable forecast upon the outcome of the election should be of general interest.

To gather data upon which to base an opinion as to the probable results of the election the Electrical World has concluded a poll of the principal newspapers of California to ascertain their editorial positions on this act. The editors of the papers were asked whether they favored the passage of the proposed bill, whether they opposed it, or whether no definite policy had been announced. One hundred two papers replied to the questionnaire, and of this number only eleven favored the passage of the act, while forty-nine opposed it. Of the forty-two remaining who stated that thus far no definite policy

had been announced, eight or ten indicated that before long they would come out editorially opposing the passage of the bill. The total circulation of the eleven papers which favor the passage of the act is 111,593, and of the forty-eight opposing the proposed bill the circulation is 522,524. The circulation of the forty-two papers which have not as yet announced a definite policy is 558,354, and that of the several papers which may later come out against the passage of the bill, 248,646. Thus, if these latter papers do oppose the passage of the bill the total circulation of those papers opposing the passage of the bill will be 807,000 as compared with the circulation of the papers favoring the bill, 111,593.

The influence the daily and weekly papers have upon the most of their readers is very indefinite. It is well known that many readers of papers disagree with the editorial policies of the papers they read, while on the other hand there is a large majority which implicitly relies upon the judgments expressed therein. In any event the percentage of readers agreeing with the policies of those papers opposing the bill should be in proportion to the percentage of readers agreeing with the papers favoring the bill. If this follows then the votes in favor of the bill should not exceed twenty per cent of the total.

Although this poll did not of course cover all of the papers of the state, it does cover all of the principal papers and represents all parts of the state.

Snowfall in the high mountains of the West is depended upon for the bulk of the agricultural and irrigation water used throughout the summer

Floods Are Prophesied on Colorado

months, as well as assuring uninterrupted flow for hydroelectric power purposes. The past winter has witnessed uniformly heavy snow-fall in all of the mountain-

ous areas of the West, and while this is good news to the majority of the irrigation districts and power companies, there are some districts to which it will not be an unmixed blessing. A high authority in the United States Geological Survey is reported in the daily press as prophesying the biggest flood in many years in the lower Colorado basin. This flood is due in the latter part of May or early in June and the prophecy is based upon reports of the depth of the snow now lying on the watersheds of the Colorado in Utah, Wyoming and Colorado. In discussing the necessity for the retention and conservation of the flood waters of the red river of the Southwest in a recent issue of the Journal of Electricity and West-

ern Industry, C. E. Grunsky, one of the foremost authorities on the Colorado, mentions that the river is now running wild over the lower delta, and that there is urgent reason for the early construction of a big regulating reservoir. Owing to the heavy silt content of the water the Colorado is always a menace, and has built its bed above the level of the surrounding land in many cases. Measures should immediately be taken to protect the agricultural land and towns from flood dangers and keep the Colorado river in its proper channel.

Colorado, which is as large as the New England states including New York, is divided from north to south by the crest of the Rocky Mountains.

Denver Seeks to Tunnel the Rockies

This impedes communication and transportation and effectually divides the state in half. Of the two railroads which connect Denver, which is on the eastern side

of the continental divide, with Salt Lake City, only the Denver and Rio Grande traverses the western half of the state of Colorado. Civic and commercial interests in Denver are seeking to have legislation passed in Colorado to create a special improvement district which will be assessed to pay the costs of building a tunnel to connect the two halves of the state. The proposal is to utilize the existing "Moffat Road," construct a tunnel six miles in length at an altitude of 9,000 feet through the crest of the mountains, and build a railroad to connect the western portal of the tunnel with the Denver and Rio Grande at Dotsero. It is said that the distance between Salt Lake and Denver would be thus shortened by fifty-five miles, over the Union Pacific distance, and would cut 172 miles from the Denver and Rio Grande. Those favoring the plan maintain that a rich mineral and agricultural region would be opened up, tributary to Denver. The economic necessity of an expenditure of between five and seven million dollars is the immediate question confronting those interested.

Due to the unprecedented growth of Los Angeles one of the most perplexing problems confronting that city is the relief of traffic congestion within the business district. The Pacific

Los Angeles Will Build a Subway

Electric Railway Company, which operates street cars and inter-urban electric trains between Los Angeles and outlying suburban

centers, in order to relieve congestion and increase its running time has made application for a franchise to construct a subway from the company's station at Hill and Fourth streets to First street and Glendale Boulevard for the use of Glendale, Hollywood, Santa Monica and San Fernando Valley trains. While not an undertaking of tremendous magnitude, although it involves the expenditure of approximately \$2,750,000, this proposal is indicative of the aggressiveness and enterprise of Los Angeles in solving its civic problems. While famous for its wide boulevards in the residential sections, the business district of the city is featured by narrow and crooked

streets. Many proposals have been made to overcome the resulting congestion, from building elevated sidewalks to constructing arcades beneath the present buildings. Whatever the remedy applied, Los Angeles can always be relied upon to do a spectacular and thorough job.

Although by far the majority of the wool grown in the United States is produced in the eleven western states, Boston has always been the center of

Distribution of Western Wool in Western Cities

the wool market. This condition arose when the only large concerns manufacturing wool products were located either in the New England states or along the

Atlantic Coast. Since that time there have been developed many large textile mills in the middle west, but Boston still dominates the market. Western growers have long held that it is uneconomic to ship their product to Boston to be graded and sold, then re-shipped to the middle west for manufacture, and have sought to establish a western center for distribution and grading. Portland has succeeded to some extent, having three wool warehouses where grading is done, and there have grown up on the Pacific Coast several wool manufacturers of national prominence. Intermountain wool growers, under the leadership of the Utah Woolgrowers' Association, are seeking to have Salt Lake City established as the concentration point for the thirty million pounds of wool that is annually produced in the surrounding territory. Sheep raisers in general have been among those who have suffered most during the past two years, and if there is any truth in the statement that cooperation flourishes in times of adversity, their efforts to form a cooperative wool market should be crowned with success.

For the first time in the history of Pacific passenger travel an institution has been formed for the mutual protection of the transpacific passenger interests.

Transpacific Passenger Conference

This was accomplished when a transpacific passenger conference was held last February, and was recently made binding and effective when all lines on the Pacific

Coast gave their consent to be bound by rules of this body. The lines comprising the new organization include the Pacific Mail Steamship Company, the Toyo Kisen Kaisha, the China Mail Steamship Company, Oceanic Steamship Company, Union line, Canadian-Australian line, Canadian-Pacific line, Admiral line, Java-Pacific line, Blue Funnel line, and the Matson Navigation Company.

The organization is for the purpose of having the various competing lines stabilize the passenger rates and to disseminate information to the public. This marks a step forward in Pacific maritime circles. The Pacific coast of the United States is destined to occupy an increasingly important position in the affairs of the world. The voluntary assumption of regulations on the part of the various passenger lines will materially aid in stabilization.

Letters to the Editor

Cooperation Will Alter the Farmer's Attitude Toward Power Companies

To the Editor:

Sir: Since the power companies of the state of California will be more in the public eye during the coming year than they have been in the past, on account of the Water and Power Act which will be on the ballot in November, it will be to the advantage of the various power companies to cultivate general approval. Owing to the large numbers of agricultural consumers in this state it should be their particular concern to see that there is no misunderstanding on the part of the power companies' duties toward the farmer.

In discussing the power station, let us first glance at the fact that after years of railroad building and study of transportation, our government and large corporations are up against transportation problems today that seriously menace the economic peace of our great republic. This alone should be lesson enough for the power companies and thousands of consumers that no delay should be allowed in placing the cards on the table face up, that every one should have a fair start in understanding the power companies' and consumers' view point and situation.

We as farmers understand, I believe, that "Water is King"; consequently, what produces water is absolutely essential. But even with the appreciation of what electric power can do, we will have to guard against such appreciation getting the better of our good judgment in allowing irregularities to go unheeded without investigation.

About 1912 or 1913, power companies commenced making long extensions in the Lodi district. At that time, lines were run free of charge to any corner of the farmer's ranch needed. Rates were offered, the justice or injustice of which was unknown to the farmer. After a time rates were somewhat changed. Furthermore, the consumer was charged for extensions from the main line to the point needed. These changes were made without any explanation to the consumer. The writer believes the consumers' attitude has never been quite the same since a charge has been made for the extensions, the farmer considering it to be rather an autocratic measure on the part of the power companies.

For a moment let us glance at some technical points that would either aggravate or please. It must always be understood that young corporations will fall short of their ideals and the public's expectations. Thus the intermittent service has caused more dissatisfaction among consumers than any other thing. To overcome such difficulties it would be a wise policy for heads of power companies to confide some of their troubles to leaders of the different farm organizations. And through these organizations such information would be looked upon with a full breadth of confidence by the farmers and consumers in general. The bond of confidence thus established would have a tendency to overcome any overbearing attitude either on one side or another. And the consumer would have no just cause for not having adequate knowledge of the difficulties and intricacies involved in modern power service.

Electricity in the home is a big thing, whether the appliance uses only a fractional part of a kilowatt per hour, or several. Appliances are generally bought with a great deal of eagerness, without any knowledge or question of how much it costs to operate. Expectation on the part of the family is high, and the dealer's promise is huge. As we all know,

electric appliances are in their infancy, and the principle of bear and forbear should not be forgotten. Yet, such an advertisement as "A satisfied customer is the best advertisement," should be avoided unless it can be followed up by service. For service should be the keynote of the electrical industry, and the lack of it will cause power companies to fall far short of their mark.

My personal benefits and pleasures from the use of electric power have met my fullest expectations. Who could not appreciate the difference between an oily and intricate piece of machinery and a clear humming motor, saying nothing of the difference in attention each require. Power has even written smiles on the face of the village blacksmith. The question however resolves itself down to whether the farmer can afford the expense of installing the extensions and continually having the yearly minimum charge hanging over his head, or must resort to the gas engine. If prunes sell at 3c. per pound, he would have to choose the cheaper of the two. If they sell at 10c., he could choose the electric power without any question, and with a great deal of pleasure to himself.

The dealers' labor question is a grave situation that the electrical industry should study and solve. After the consumer has paid for his extensions and signed his contract for power, his troubles are not yet over. For short hours, high wages and inefficient labor will reflect upon the popularity of every branch of this wonderful servant to man.

In concluding, let us try to get the power companies and consumers to feel that one is an asset to the other, that only by light and good will can each prosper and develop as it should.

Acampo, California.

WALTER V. JAHANT.

An Electrical Home for an Electrical Man Demands an Adequate Salary

To the Editor:

Sir: In your issue of March 1, I noted with particular interest the article headed "A Few Ideals to Shoot At." There probably was never a more opportune time than the present for bringing to the attention of the public and the electrical men as well the advantages attending the various uses of electricity. In order, however, to assist the public in education along this line the electrical men in general must stand unreservedly and whole-heartedly behind the industry in all its phases.

In our various electrical publications today, particularly those having to do with merchandising, we are all urged to do our utmost to promote the welfare of the electrical industry. The desirability of possessing securities of public utility corporations, the advertising value of having our engineers supplied with electrical conveniences in the home and the economic advantages obtainable by a more general use of electricity in manufacturing processes are all familiar subjects. But first the engineer himself must be able to afford the various electrical appliances before he gives them his unqualified endorsement and explains their use to his neighbor. It seems reasonable to assume that with the engineering field offering a better financial attraction the effect on the industry would be marked indeed, to say nothing of bringing to the fore many men who are otherwise drawn into other lines of work simply because the profession does not pay.

This it would seem is an important factor and one not to be overlooked when we are asked to boom the electrical industry. One most certainly hesitates to advise a man to choose an electrical career unless he is exceptionally brilliant. Until such time as the electrical engineering profession is placed on a better paying basis the industry is bound to suffer accordingly.

Schenectady, New York

F. E. JAQUAY.

Builders of the West

IN this day of specialists it is refreshing and instructive to come into contact with men who draw inspiration and knowledge from many sources. Arthur B. West, as vice-president and general manager of the Nevada-California Electric Association, follows closely the latest developments and best thought in astronomical science; he makes hobbies of horticulture and botany; and is an inveterate reader of many subjects ordinarily untouched by the busy executive.

In tracing the years between his birth at Rochelle, Illinois, in April, 1875, and his graduation from Stanford University in 1899, the likes and doings of the boy and man manifested an early yearning for book knowledge of applied sciences and law. This passion for reading was not to be satisfied to the exclusion of outdoor sports and activity but rather crowded into his otherwise normal life. Long before graduation at college he had a reputation for digging longer and deeper into the major subjects of his class-work than was considered necessary by his fellow students. He continued in college for a post-graduate course of two years to perfect himself in law.

Seven years after leaving school found him working early and late in a Denver law office, as junior member of the firm of Potter and West, counsel to the Nevada-California Power Company.

Realizing that progress on a large scale could never take place with a one-sided growth in the market for power such as the Nevada mining districts afforded, Mr. West and his associates turned their eyes southward where potentially rich desert valleys and mineral resources waited for the day when men would consider the true possibilities of their development. For two years the most exhaustive surveys of commercial, geological, and engineering conditions were conducted by the best authorities in the country. In the end it was considered safe as an investment, and practical as an engineering feat. The work was started in spite of the fact that no precedents were on record which quite compared to this venture. One engineering firm with an interna-



ARTHUR B. WEST

Who, as vice-president and general manager of the Nevada-California Electric Corporation and president of the Pacific Coast Electrical Association, has been one of the leaders in the development of the western power program, the underlying factor in the remarkable industrial and agricultural progress of the last decade.

tional reputation went so far as to discourage the proposed transmission plans on the grounds that it was double the next highest voltage then in California, that the problems to be encountered could not be anticipated and therefore might be insurmountable; furthermore they condemned the outdoor substations as without merit, and unwise.

Mr. West was called from the legal to the operating side of the business at the time the extension into southern California was first undertaken, as vice-president and assistant to Delos A. Chappell, the president of the company, and the man whose vision and financial genius made possible the realization of this tremendous development. When Mr. Chappell lay at the point of death from injury by accident, he called upon Mr. West to carry on the work that he was forced to drop. Today the company holds the world's record for long distance transmission of power, and it has,

to a remarkable extent, developed its own power market. Refrigeration and ice-making plants belonging to a subsidiary company today afford an annual power revenue of a quarter of a million dollars and this load is growing by leaps and bounds from year to year. A large irrigation load has developed as the productiveness of these once waste deserts responds to the power pump and irrigation ditch, not feasible until the advent of cheap electric power.

Arthur B. West's love of research has never diminished during the years of his experience with mining, irrigation, and public utility developments. It may account for the quiet poise and manner with which he seems to receive each new problem, as if he were cataloguing it for future reference.

He loves to spend a limited time in out-door diversions at golf or yachting.

So to Arthur B. West, for his insatiable desire to improve himself that he may better serve his fellow-man and for his devotion to the upbuilding of the electrical industry in the West, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Experimenting with Electrical Transmission at 224,000 Volts

Experience with Apparatus as it has Stood Up Under Actual Operating Conditions at 224,000 Volts and a Discussion of Equipment Necessary for the Pit River and Big Creek Lines When They Go Into Action

H. MICHENER, Chairman*

From the days when 10,000-volt transmission was considered beyond the range of scientific possibility to the present experiments with 224,000 volts on a section of the Big Creek line of the Southern California Edison Company, the West has been looked to as the leader in this field. The report of the committee on High Voltage Apparatus of the Pacific Coast Electrical Association presents the results of the latest experience in high voltage work and indicates many of the difficulties overcome as well as the problems still to be met.

Oil Switches —

There are two schools of oil switch designers. The first advocates two vertical breaks per pole. This school has designed all the switches which have been built for voltages above 110 kv.

The second school advocates from two to ten breaks per pole; horizontal breaks; high head of oil above break. These designers have had extensive experience with voltages up to and including 110 kv.

One maker of the first type describes his 220-kv. switch as follows:

These breaks are of the round tank, downward break design, having two breaks per phase in each tank. The breaking contacts are of the so-called "explosion chamber design." The walls of the explosion chamber are made of strong seamless sheet tubing, the top is a steel casting having a central opening for the passage of the moving contact rod. The walls of the chamber are insulated on both interior and exterior, as is also the bottom. An insulating bushing passes through the center opening.

In opening the circuit, a downward movement of the moving contacts separates them from the stationary contact inside the explosion chamber and starts an arc. The arc dis-associates and vaporizes some of the oil in the chamber and produces a very high pressure which accelerates the moving electrode and ejects the oil in the arc stream. The use of an explosion chamber decreases the length of the arc drawn and takes up the major part of the pressure generated by the arc in the oil.

Another manufacturer describes his oil switch of this class, as follows:

For our 220-kv. circuit breakers we supply either the elliptical or round tank type, the latter having higher ratings as to rupturing capacity. The contact details are, however, the same in both types. A quick break device used for the arcing tips consists of a bayonet held in the stationary contact and bushing by a long helical spring. As the breaker opens, this bayonet is pulled out by fingers on the moving member until the main contacts are separated by several inches, after which the fingers release and the bayonet is quickly pulled back into the bushing, thus giving a higher speed for the final rupturing of the circuit. This principle has been in use on the larger 110-kv. and 254-kv. breakers for several years. The force of the explosion is taken by the heavy tanks which are of such shape and strength as to be able to withstand the resulting pressures.

One of the makers of the second type of oil switch writes:

For very heavy duty we are now bringing out a 6-break switch with round tanks and greatly increased oil capacity, both in volume and depth above the breaks. These switches are so designed that two additional sets of contact can be installed in each tank at any time, giving 10 breaks in series in each phase, should the generating capacity of the system increase to a point where the 6-break will no longer handle it safely. If the switch is electrically operated, a second control unit is added, in order to handle this number of contacts. The cost of increasing a 6-break switch to a 10-break is only about 20% of the first cost of the switch. Air control may be used with these switches if desired.

He further states that the probability of one break of the multi-break switch opening at the zero point of the wave and the speed of increasing the total length of openings in the circuits are greatly in favor of the multi-break switch. Another point claimed in its favor is that the bubbles of gas formed are smaller in the inverse proportion to the number of breaks and the smaller bubbles cool more rapidly than the larger ones.

Behavior of Switches in Operation —

The only true measure of comparative value of oil switches is that obtained by a comparison of their behavior under the same conditions. This comparison is very difficult to make because conditions are never the same, even in the same station. In one of the 60-kv. switching stations of the Southern California Edison Company, there have been several of the four break, horizontal break switches for several years. It is calculated that the short circuit at this station could be as high as 5500 amperes. The record of the automatic opening of these

switches over a period of three years, is as follows:

No. 1.....14 times	No. 5.....14 times
" 2.....12 "	" 6.....33 "
" 3.....36 "	" 7.....46 "
" 4.....21 "	" 8.....3 "

This is a total of 179 automatic openings for the eight switches.

A few gallons of oil were thrown out eight times. The seam of one tank was opened on one occasion. At the end of the three-year period under consideration, some of the blades were more than half burned away; the contacts were in very bad condition; there was nearly one-half inch of carbon and "muck" on the insulators and pantograph boards, but the switches were still "on the job," having opened two heavy shorts just previous to the time of overhauling.

These switches have now been changed by increasing



Opening a charging current of 27 miles of line at 240,000 volts, at the Eagle Rock Substation of the Southern California Edison Company. It is clear from this photograph that air switches at such voltages must be of enormous dimensions. The camera was open throughout the time of the arc. A one-fiftieth of a second snapshot of the same discharge is shown in the lower right-hand corner.

*Sub-Committee on High Voltage Apparatus: H. Michener, Chairman, J. L. Moore, J. P. Jollyman, E. E. Volk, J. A. Koontz, A. W. Copley, J. N. Kelman, R. H. Halpenny, Carl Heinze.

the number of breaks per pole to six. During the three months since this change was made there have been several automatic operations as follows:

No. 1..... 1 time	No. 5.....10 times
" 2..... 0 "	" 6..... 2 "
" 3.....12 "	" 7..... 1 "
" 4..... 3 "	" 8..... 0 "

On the two most severe shorts about two gallons of oil were thrown out of the switch. In the case of Switch No. 3 the twelfth opening was very severe. Later the blades and contacts were examined and found to be burned, but not enough to require replacement, so they were smoothed with a file and put back into service. Arcing contacts have now been installed on Switch No. 3, which we think will prevent the burning of the main contacts.

In another station near the one mentioned in the last paragraph, there are 10 switches of the two-break, vertical break, explosion chamber type. There has been a total of 36 automatic switch operations among these switches, some of them operating more than one-tenth this number of times. These operations have not caused any throwing of oil. These switches have recently been overhauled after about two years of operation since the last overhauling. The contacts were all in almost perfect condition, requiring only a few strokes of a file to smooth them. The maximum short circuit current calculated for these switch positions is of the order of 4,000 amperes but the relays are set with a considerable time delay.

Power Required to Operate

The above information is not conclusive but indicates that both types of switches are doing their jobs with a fair degree of success. The amount of power required to operate these large oil switches is of interest and apparently is not susceptible of easy determination. One lot of 165-kv. switches was shipped to the job with one solenoid per switch. When the switches were installed and filled with oil, this one solenoid would not operate it properly. Another solenoid was added to each switch. Apparently the single solenoid operated the switch satisfactorily when set up in the shop and not filled with oil.

For another lot of 220-kv. switches, the manufacturer has twice increased his estimate of the number of solenoids required. They are now being furnished with four solenoids per switch and will require 500 amperes to operate them.

For comments on dielectric tests on oil switches see paragraph under "Transformers."

For the indoor use of isolating other apparatus from the circuit, the single pole disconnecting switch operated by a portable switch stick is entirely satisfactory and three are less expensive than one three-pole switch. When the clearances, due to high voltages, make it necessary to install the disconnecting switches so high that it becomes impracticable to operate them with a portable switch stick, a switch stick may be permanently attached to each switch blade and operated through a bell crank and operating handle located at the floor.

It does not seem advisable to use a portable switch stick to operate outdoor air switches on 220-kv. circuits. This would be safe enough in fair weather, but in wet weather the risk to the man holding the stick would be too great, even with a grounded collar part way up the pole.

The outdoor single pole disconnecting switch with permanently attached operating mechanism, similar to the one for indoor use referred to above, can be operated with safety during wet weather, provided suitable insulation is installed in the operating mechanism. The Southern California Edison Company is designing such a switch for 220-kv. operation with 12 ten-inch disc insulators in the operating pole. Otherwise the operating mechanism is similar to that at Big Creek No. 8, an illustration of which is included.

Crossover Stations Necessary

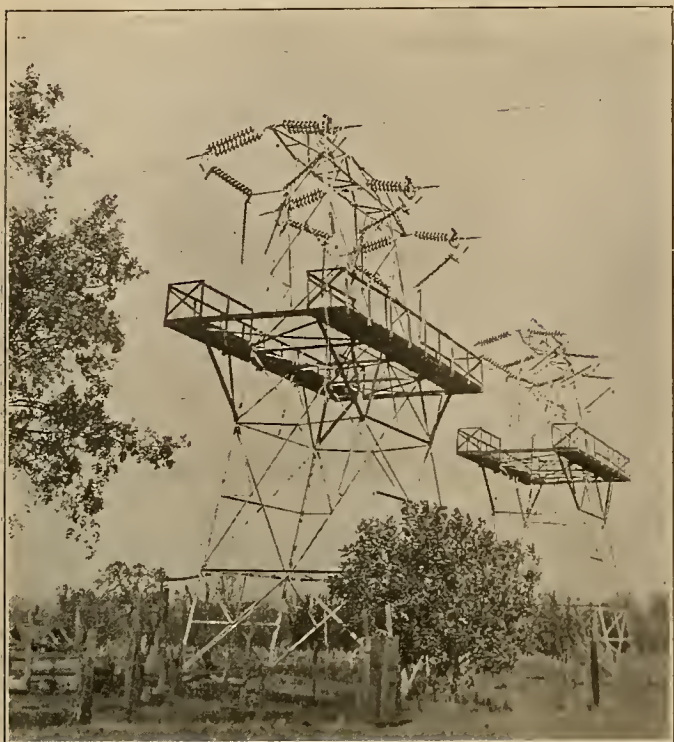
On the Big Creek line it is necessary to provide five new sectionalizing and crossover stations so that only a short section of the line need be taken out of service for maintenance and construction work. This is particularly important



Single pole 220-kv. disconnecting switch at the Big Creek No. 8 station of the Southern California Edison Company. A portable switch stick is satisfactory with indoor work at high voltages.

for the work of re-insulating for 220 kv. One of these crossover stations has been built at Newhall and is shown in the photographs. The switches consist of a blade short circuiting a pillar type insulator, and operated by a switch stick. Those in the crossover successfully open and close the paralleling current at 150 kv. but it was felt that a better switch should be developed so that the crossover stations will still be useful after the line voltage is raised to 220 kv. Accordingly, a switch was designed which would open upward above a single string of fifteen standard suspension insulators in a horizontal position. One of these switches was made and tried out at 240 kv. It opened the charging current of 27 miles of line without difficulty. The arc drew out to about fifty feet in length, persisted for about five seconds, and extended approximately twenty feet above the switch. While this switch was electrically a success, it was mechanically too loose jointed, it being quite difficult to guide the contacts together. For this reason it was abandoned and another type of upward opening switch has been developed with both the contact end and the hinge end supported in three directions by strings of insulators. This switch, which will be capable of opening the paralleling current between the lines at 220 kv. is being used as the crossover switch. The line switches in the towers will be a single blade short circuiting a pillar type insulator and will never be opened when the line is energized. The switches in the towers will be opened by a switch stick; the crossover switches will be operated by permanently attached switch sticks and bell cranks—one for each single pole switch.

The length of the arc drawn by the switch when opening the charging current of 27 miles of 220-kv. line shows very conclusively that an air switch for sectionalizing a 220-kv. line when energized must be of enormous dimensions. These



South towers at the Newhall Crossover Station, on the Big Creek lines of the Southern California Edison Company. This is one of five such stations necessary to facilitate the isolating of sections in handling repair work and similar interruptions.

tests were made in practically still air. If a wind were blowing the arc might be blown to one side at least as far as it rises in still air and might even be blown somewhat below the horizontal.

Three pole single break and double break air switches for high voltages are made by the large manufacturers, by Mr. Bowie and perhaps others. In general each pole of such a switch consists of a rotating pillar insulator which is connected through suitable links and cranks to one blade; for the single break switch, or two blades for the double break switch. Each blade is supported at its hinge end on a pillar type insulator and the contacts for each blade are carried on another pillar type insulator. The rotating insulators are connected together and to the common operating mechanism by suitable links and cranks. There has been some trouble in keeping the three poles in proper alignment and the force with which the blades are closed has broken chips out of the insulators in a number of instances. Some manufacturers use springs to cushion the blow of the blade at each end of its travel.

Transformers —

The transformers which have been built for the 220-kv. are of the core type, the low voltage coils are cylindrical and the high voltage coils are of the pan-cake form. Each coil stack of the high voltage winding is divided into two parts, the upper half being in parallel with the lower half and the two middle ends being connected to the high voltage terminal; the lower and upper ends being grounded to the core.

At the present time, proposals on shell type transformers are being submitted. The claim is that certain advantages in the grouping of coils to obtain suitable reactance values between the various windings and rigid bracing can be obtained in this way. Graded insulation is used in the shell type as well as in the core type.

The use of solid grounding at one end of the transformer

winding permits of a very large saving of insulating material when compared with the more usual type in which the insulation between coils and case must be sufficient for the full line voltage.

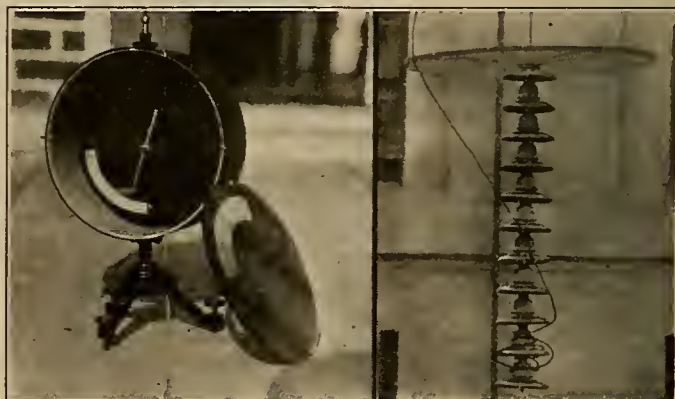
All star-star transformers or star-star auto-transformers for 220 kv. should be provided with tertiary windings for the following purposes.

- (1) To provide a path for the third harmonic magnetizing current, and thus practically eliminate the third harmonic current through ground connection.
- (2) To stabilize the neutral of the system.
- (3) To allow sufficient current to flow in case of a grounded line to give adequate relay and breaker operation.
- (4) To provide a low voltage source of supply for the operation of synchronous condensers or other suitable load.

The practice of basing dielectric test values for apparatus connected to a transmission line on the full line or delta voltage has been carried along generally regardless of whether the line is to be operated with a free neutral or a solidly grounded one, although it is obviously not equitable to test two terminals at the same voltage when they are to be operated at widely different voltages. This factor, of course, has been recognized, but the saving to be effected by alternating the test conditions would not amount to very large figures until voltages higher than 100 kv. were reached. For 220-kv. systems, advantage can be taken of the savings by building transformers with graded insulation using solidly grounded neutral and reducing the voltage test somewhat. For transformers with grounded neutral a wet test of 2.73 times the line neutral voltage has been generally assumed as fair, this value being taken from the A. I. E. E. rules for single phase, solidly grounded lines. This gives a test voltage of 350 kv. for transformers operated on a 220-kv. grounded neutral system. By the same reasoning, circuit breaker tests should have the same value, as circuit breaker terminals are connected to the transformer terminals.

Lightning Arresters —

In general, the higher the operating voltage the less chance there is of line disturbance, due either to switching arcing grounds or lightning, being of great enough potential to break down the normal insulation of the system. For this reason, lightning arresters' protection is not so essential for extra high voltages as it would be for lower voltage operation. An additional protective feature of extra high voltage systems lies in the fact that conductors are used having a



Static volt meter used in series with a string of insulators and shield to measure high voltage. This is a laboratory outfit, but similar equipment could be adapted for field use.

diameter slightly beyond the value at which corona will form under normal operation. High voltage surges will, therefore, produce corona and the energy of such surges will be dissipated.

The conclusion to be drawn in regard to lighting arrester protection for these systems is that their value will depend upon the location of the line, that is, whether the line is in

a country subject to electrical storms at frequent intervals, or the like.

Meters —

The accompanying photographs show a static volt meter which can be used in series with a string of suspension insulators to measure high voltages. The needle is deflected away from the supporting frame when they both become charged at the same potential. The needle comes to rest when the repelling couple is balanced by the gravity couple. Such a meter when made carefully, can be relied upon to read accurately to within 1%. By suitable balancing of the needle it can be made to read voltages as high as the bushing in the top of the case will stand.

In the photograph showing the string of insulators and the shield, the wire wrapped around the string of insulators is there temporarily, while the equipment is not in use. The outfit as shown is suitable for laboratory use. To adapt it to give continuous readings in a station, much more nearly complete shielding will have to be devised. There seems to be no reason why this cannot be done, however.

Arrangement of Apparatus in Station —

There is very little that can be said in a general way on this subject. The following table, which is taken from a General Electric Company leaflet, is of interest in connection with the spacing of conductors.

The dimensions given in the table are based on striking distances between points, and are for guidance in determining proper distances between conductors and for general construction work. They do not apply to electrical apparatus of types where the shape of conductors can be controlled, and where smaller distances are therefore permissible.

SPACING OF RIGID CONDUCTORS

VOLTAGE RANGE	Dimensions in Inches			
	Outdoors		Indoors	
	To Ground	Between Live Parts	To Ground	Between Live Parts
50,001 to 73,000	36	41	27	36
73,001 " 95,000	47	53	34½	47
95,001 " 115,000	56	64	41	56
115,001 " 135,000	66	75	48	66
135,001 " 155,000	75	86	55	75
155,001 " 175,000	85	97	62	85
175,001 " 195,000	94	108	69	94

Correction for Altitude

Sea level to 1000 ft.—Use tables

1000 to 3000 ft.—Add 10 per cent to spacing in tables

3001 to 5000 ft.—Add 20 " " " " " "

5001 to 7000 ft.—Add 30 " " " " " "

7001 to 9000 ft.—Add 40 " " " " " "

Synchronous Condensers —

While not high voltage apparatus, synchronous condensers are a necessary adjunct to high voltage apparatus.

In the use of synchronous condensers it would be desirable if they could be applied so that advantage could be taken of the full range from zero lagging power factor to zero leading power factor, but so that the requirements would not necessitate machines of abnormal design. A normal design with 100% capacity at zero power factor leading, will give approximately 40% of capacity at zero power lagging. An increase in the lagging rating can be obtained by increasing the air gap and the amount of iron at an increased cost. Therefore, in laying out the transmission characteristics of the normal design machine should be borne in mind. Machines of abnormal design will probably be required for the first installations on a system but normal designs may be used in later installations.

Industrial Heating Installations Show Satisfactory Results

Record of Progress in the Field of Industrial Heating for the Past Year as Reported by the Industrial Heating Committee of the Pacific Coast Electrical Association Indicates Future for this Equipment

ELBERT KRAMER, Chairman *

During the past year, installations in industrial heating on the Pacific Coast have included such varied equipment as arc furnaces, vitreous enameling furnaces, enameling ovens, tempering ovens, drying kilns, electric welding sets, oil well heating, liquid heating, and other special applications.

Power Company Policy

Small power companies, generally, report having no experience in industrial electric heating, and offer consumers no incentive in the way of rates to encourage this development, due largely to the limited number of industrial plants in the territories in which they serve. Many of these power companies are generating by steam.

The early part of 1920 found the larger power companies recovering from the power shortage of the previous years. During the latter part of 1921, the first units of several large hydroelectric developments were added to the systems of these companies, thus putting an end to the power shortage, and creating an incentive for the development of new load. With plans complete for addition of new units from time to time, the various power companies are confronted with the problem of disposing of large quantities of energy. New business departments of these companies recognize the fact that industrial electric heating offers a fertile field for the disposal of this power, and are expending considerable effort to secure data and perfect their organizations for securing this business in 1922.

Although the Pacific Coast leads in hydroelectric development, it lags behind the East in the application of electricity to industrial heating, and is forced to guide its progress by eastern experience.

Power Schedule for Industrial Heating

The power companies, generally, are applying their power schedules to this class of usiness.

The following is an outline of a typical power schedule:

RATE:		RATE PER KW-HR. FOR MAXIMUM DEMAND OR ACTIVE LOADS OF—			
Consumption per Hp. Per Month		Less than 10 Hp.	10 Hp. to 24 Hp.	25 Hp. to 49 Hp.	50 Hp. to 99 Hp.
First	60 kw-hr.	4.0c.	3.6c.	3.1c.	2.6c.
Next	60 kw-hr.	2.1c.	2.0c.	2.0c.	1.7c.
Next	60 kw-hr.	1.3c.	1.3c.	1.3c.	1.2c.
All over	180 kw-hr.	1.2c.	1.1c.	1.0c.	1.0c.
		100 Hp. to 299 Hp.	300 Hp. to 799 Hp.	800 Hp. and Over	
First	60 kw-hr.	2.2c.	2.0c.	1.8c.	
Next	60 kw-hr.	1.5c.	1.2c.	1.1c.	
Next	60 kw-hr.	1.1c.	1.0c.	0.9c.	
All over	180 kw-hr.	0.9c.	0.9c.	0.8c.	

Where active connected load of less than one horsepower is served under this schedule, the installation shall be rated as one horsepower.

MINIMUM CHARGE:

(a) Connected Load Basis: \$1.00 per month per hp. of active connected load for the first 50 hp., plus \$.60 per month per hp. for each hp. of load in excess of 50 hp., but not less than \$2.00 per month.

(b) Maximum Demand Basis: \$1.00 per month per hp. of measured maximum demand which shall not be less than 20 per cent of the total active connected load, and in no case less than \$50.00 per month.

* Industrial Heating Committee: Elbert Kramer, chairman, W. Wesley Hicks, A. E. Holloway, H. C. Rice, H. E. Sendoval, A. Strauch.

Progress of the Science

In looking over the past year's developments, we find a number of very interesting applications, and a growing appreciation of the advantages of electric heat such as the ease of control, lessened fire hazard, saving of space, reduction of labor, improved product, fewer rejections and in many cases, reduced cost of the finished product.

Industrial heating may be divided into two general classes: hot wire or resistor class, operating at temperatures not over 2000° F., and the arc-type for temperatures above 2000° F.

Following are descriptions of the more interesting installations:

SUCCESSFUL METAL MELTING FURNACE

A single-phase arc furnace operating very satisfactorily is one of 350-kva. capacity used for the melting of steel. This is a one-ton furnace, but charges as much as 5800 lb. have been handled.

Electricity is delivered at 2300 volts and is transformed to an operating voltage of 220 v. A reactance coil is installed in series with the primary coil of the transformer.

The daily run is usually two heats. The consumption is approximately 800 kw-hr. per ton operated, processed on single heats; 700 kw-hr. per ton on double heats.

Electricity is contracted for on regular power schedules. Power factor runs from 80 to 85%.

ARC FURNACE PRODUCING WHITE IRON FROM UNUSUAL SCRAP

An arc furnace is used for salvaging old tin cans. One hundred tons per month are handled by this electric furnace. It is a three-phase arc furnace of 1.5-ton capacity, cylindrical type, with end charging doors, and tilts on its axis. Doors and tilting mechanism are air operated.

The circuit is fed by two 400-kva. transformers, with a 17,300/125 volt ratio. The electrodes are manually controlled, and the normal operating current is 2,500 amperes per phase. The 5-in. graphite electrodes have water cooled holders.

The cans, when delivered to the foundry, are loaded on to a conveyor belt, which passes over a magnetic pulley, separating them from material such as glass, which has been brought in with the cans. They are cleaned by heating in an oil flame, and then pressed into blocks 12 in. by 12 in. by 18 in.

These blocks are charged into the furnace as the melt progresses. Borings and turnings may be added. Although the furnace is rated 1.5 tons, it is possible to charge 2 tons per heat. With a cold furnace, the time required to melt the charge is about three hours, and with a hot furnace, two hours.

This plant specializes in the manufacture of wear-parts for grinding machinery, balls, linings, crusher jaws, etc. This product requires hard metal, and the carbon content is brought up to approximately 2.18% by the addition of carbon briquettes to the charge.

Working at the rate of 3 heats in 8 hours, the power consumption averages 512 kw-hr. per ton of steel. The cost of electrodes averages \$1.03, and the lining repairs, \$1.05 per ton.

As compared with the cupola, the overall cost of production is about the same, but a better grade of steel can be produced with equal cost in the electric furnace, and the charge may be refined or alloyed, as required, for special orders not in the line of stock production.

ENAMELED IRONWARE FURNACE INCREASES PRODUCTION

A furnace of 180-kw. capacity is used in the manufacture of sanitary ware. This furnace is operated at from 40 to 80 volts and is controlled by a special transformer with taps and dial switch. The temperature is maintained automatically at 1700° F.

The heating unit consists of 10 elements, of 18-kw. capacity each, made up of 1 in. by ½ in. resistance ribbon.

The inside dimensions of the furnace are 7 ft. by 8 ft. by 4 ft., high lined with fire brick, with an outer wall of common red brick. The outside dimensions are 12 ft. by 12 ft. by 8 ft. high. This furnace was originally oil fired, later being converted to an electric furnace without any additional heat insulation being supplied. When fired with oil, the daily production was 18 bathtubs, which production was increased to 24 bathtubs, when operated electrically (on an 8-hr. basis).

The cost of oil was approximately \$1,000 per month.

The cost of electricity is about \$1,000 per month.

In addition to the increased production, rejections have been practically eliminated.

The furnace is a highly satisfactory load for the power company, consuming approximately 100,000 kw-hr. per month, operating 24 hours per day, 30 days per month. This installation has proven so satisfactory that all the remaining oil fired furnaces in the plant are now being electrified.

IMPROVED PRODUCT WITH TEMPERING FURNACE

Another conversion from oil to electric heat is evidenced in an electric tempering kiln of 182-kw. connected capacity, used to temper steel bed springs.

This furnace is constructed of concrete, the walls being 6 in. thick. When changed from oil to electric heat, this furnace was lined with an efficient heat-insulating material and covered on the outside with a layer of insulating brick.

This furnace operates at 440 volts, 2 phase, 60 cycles. Temperature is automatically maintained at 500° F. A time switch is used to start the heat automatically, each morning before the opening of the factory.

The inside dimensions of this furnace are 12 ft. by 22 ft. by 9 ft.

The fuel cost per spring when using oil was.....\$.031

The energy cost per spring when using electricity.....\$.0357

The conversion from oil to electricity resulted in:

- (1) Improved product, having reference chiefly to better temper obtained with electric heat.

- (2) Increased production by complete elimination of shut-downs necessitated when operating with oil, in having to replace portions of the fire box. These repairs required approximately half a day every two weeks.

This kiln is also used for enameling the assembled product at about 250° F. The above costs include tempering and enameling.

Even though the cost of electric energy is slightly higher than oil, the increased production, elimination of shut-downs, and repairs, have made the resultant unit cost of the finished product approximately the same as when using oil. Improved product was the paramount issue with this concern.

ENAMELING OVEN SHOWS EXTREME FLEXIBILITY

An interesting installation is that of an enameling oven in a large sheet metal works. This oven has an installed capacity of 75 kilowatts and operates at 220 volts, 2 phase, 60 cycles. Operating temperature is 200° F. Inside dimensions of the oven are 10 ft. by 22 ft. by 8 ft., the oven being of double metal wall construction, filled with heat insulating material.

This installation is particularly fascinating because of its fully automatic features. Either end or both ends of the oven can be operated individually as separate units. This is accomplished by inserting a removable insulated partition in the center of the oven. Double thermostat, double control panel and double ventilating systems permit this separate operation but are so installed as to permit the simultaneous operation of these two units when so desired. It is further possible to operate simultaneously both ends of the oven at different temperatures. When operating the entire oven as one unit, the heat insulated barrier is removed and the entire oven functions as one unit.

This factory is highly pleased with the results obtained in uniformity and quality of product, together with the cost of electric energy.

OIL PIPE LINES ELECTRICALLY HEATED

Another unusual electrical heating process is a recent installation for the heating of an oil pipe line where, due to the heavy gravity of the oil and to coldness, it would not flow through the pipe line.

The fuel oil tank is located on a knoll about 75 ft. above the level of the boilers. The oil is fed to the burners through a 3-in. pipe. In cold weather the oil would not flow.

A 5-kw., 440/5-volt transformer was installed, the secondary cables of which were clamped to the pipe near the tank. The distance between terminals was regulated so that the resistance of the pipe allowed a flow of current which was full load on the transformer. The heat generated in the section between the secondary terminals is conducted along the pipe by means of the flowing oil so that no trouble is experienced with the flow of the oil.

PIPE ANNEALING PROCESS SAVES RENEWAL COSTS

A rather unique, but perhaps not so desirable a load from the central station standpoint, is an electric pipe annealing process, one installation of which is now in successful operation.

Pipe used for the driving of oil wells becomes crystallized and useless, but is said to be reclaimed by the following method. The installation consists of three 100-kva., 10,000/50-volt transformers connected in multiple on one phase of a 10,000-volt transmission line. The pipes, 6½ in. in diameter, 19 lb. per foot, and 18 to 24 ft. long, are placed at each end. These blocks are forced against the ends of the pipes, by means of a screw and hand wheel, with a pressure of 3 tons. A heavy spring allows for about 4-in. expansion. The current flows through the pipe for about 20 minutes, heating it to 900 degrees C. The heat thoroughly anneals the pipe, with a saving of 75% to 80% over the cost of new material.

Short sections of pipe may also be welded with the same apparatus. The inductive effects of the heavy current are diminished by laying the cable within 8 inches of the pipe and eliminating, so far as possible, all closed-in circuits on the apparatus.

ELECTRIC INCUBATORS IN COMMON USE

A typical installation of the electric incubators is one in which there are 26 incubators with an average connected load of 1 kw. each. The average capacity of each is 1,000 eggs and the dimensions 16 by 34 by 114 in. They are built of ¾-in. Oregon pine with ¼ in. of paper in the top for heat insulation.

The 110-volt unit consists of straight No. 24 galvanized iron wires, running lengthwise inside the incubator and fastened to the top. The temperature is controlled to within .5 degrees F. by a wafer thermostat and relay switch. The cycle of operation varies with the temperature of the room, but is approximately 1.75 min. "on" and 3 min. "off."

The hatch is started at a temperature of 101 degrees F. and finished at 103 degrees F. About 70% of the eggs produce chicks.

FRUIT MARKING NOW POSSIBLE

A machine has been developed for the trade-marking of citrus fruits. The fruit is carried under revolving dies by belt conveyor. These dies are automatically inked, but the ink will not transfer to the fruit unless the dies are heated.

A 725-watt heater is built into the roller which carries 7 dies. In localities where a constant voltage is obtainable, the heat is regulated to approximately 315 degrees F. by means of a rheostat. If the voltage is variable, the heat is controlled by a thermostat and relay switch. The maximum capacity of the machine is 560 oranges per minute. This machine is operated by a variable speed motor.

This apparatus is being developed to mark apples, peaches, cantaloupes, etc.

OIL WELL HEATING INCREASES PRODUCTION

Rugged immersion heaters of special design, in capacities of five to ten kilowatts, have been used in heating oil wells where the oil could not be readily pumped without heating. These heaters are rigidly fastened to the pump and serve to heat the oil around it, at any depth. A well operating about 700 feet underground, producing 20 barrels a day with difficulty, installed a five-kilowatt electric heater, making it possible to pump 80 barrels with ease in about one-third the time.

LUMBER DRYING KILN SATISFACTORY

This installation consists of a lumber drying kiln of 9-kw. connected capacity operating at 220 volts, 3 phase, consuming approximately 900 kw-hr. per month. The kiln is used for seasoning hard woods, and is reported to be in every way satisfactory.

Innumerable installations of small appliances of less than 5 kw. each, are doing much to build up power company loads, which produce relatively large revenue, with little or no capital investment on the part of the power companies.

Recommendations

In order to secure this industrial electric heating business on a large scale, in competition with various fuels, it is the opinion of this committee that better rates are required than the regular power schedule. It is suggested that owing to the high power factor, favorable load factor and night load possibilities, the power companies would be justified in extending discounts from their present power rates.

Since the application of industrial electric heating is a highly technical matter, all interested in the development of this work should have technical as well as commercial train-

ing. Misapplication at this time would seriously retard growth and will offset the advantages of many successful installations.

It would be a stimulus to the development of this industry if the power companies were to maintain suitable display and demonstration rooms, where devices could be set up and operated.

We suggest that the manufacturers assist this development by making sure that their apparatus is right before putting it on the market and by endeavoring to make the selling price more nearly competitive with apparatus heated by other means.

It would undoubtedly be to the advantage of the smaller power companies to make rates and put forth other efforts toward the upbuilding of this load, especially by the introduction of the smaller industrial heating appliances.

Increasing the Use of Electricity for Cooking and Heating

An Idea of the Possibilities in the Field of Domestic and Commercial Electric Cooking and Heating Gained from a Study of Existing Practices and Policies Among the Major Power Companies of California

F. H. WOODWARD, Chairman *

The electric cooking and heating business is a field of development in the electrical industry which is still so young as to be yet in the formative stage.

The committee, which was appointed to report on the subject, feels that the most effective way in which to treat it, is to gather together and coordinate information as to the progress in the development of this class of business during the past year, and profiting by past experience, point the way to greater uniformity and encouragement of this business in the future.

Power Company Experience and Policies

It is evident from reports received that most of the larger and some of the smaller power companies now see the possibilities and ultimate value of this load, but it would seem that many of the smaller and a few of the larger companies are still in doubt as to the advisability of encouraging it.

Many have established rates and regulations that make the load possible, some being very attractive and opening up a wide field, while others are such as to limit the field. On the whole, it would appear that substantial progress is being made in the education of power company men as to the satisfactory results that can be obtained with present day cooking and heating appliances, the great service that can be rendered the public, and the large increase in revenue possible by the building up of this service.

Possibilities of Domestic Load

A central California company reports a revenue for 1921 of approximately \$195,000 from domestic and commercial electric cooking and heating alone. This company is one that fully appreciates the possibilities and is lending every encouragement to the building up of the heating and cooking load. Under its various schedules the rates vary from a maximum of 4.2c. to a minimum of 1.1c. per kw-hr. On this system, the customer has the choice of combining lighting, cooking and heating on one meter, or of having the lighting on a separate meter. He is also permitted to include motors not in excess of 5 horsepower on the heating and cooking meter.

Policy in Sales and Installations

About 50% of the companies are now actively engaged in selling ranges, water heaters and air heaters, while others leave the sales entirely to dealers. Most of those companies who are selling are maintaining the established prices, or are at least selling at such an advance as will allow the dealers to compete, while a few are selling at cost. In the latter case, the dealers are unable to handle sales profitably.

At least two of the large companies who are now actively engaged in selling these appliances, have announced their intention to materially increase their activities in this direction for the year 1922.

A few companies are making their own installations, but most of them are passing this work over to the contractors, some allowing the contractors to make their own arrangements with the purchasers of the ranges, while in other cases the power companies are selling the ranges installed, and letting the work out to the contractors either on time and material basis, or on a certain price bid. Some companies require the installation of a double throw switch between the range and water heater. Others recommend a double throw switch and encourage it by making the rate or the minimum more favorable in cases where it is installed, but do not compel their customers to use it, and others are indifferent. However, where large capacity water heaters are in use, it is undoubtedly advantageous to the power company to have the switch installed on account of the reduced maximum demand, and the improved load factor. In some large establishments where the range is in almost continuous use, however, a double throw switch cannot be used with satisfaction to the customer.

Extensions are generally made on a revenue basis, similar to motor power extensions. Some companies require the customer to pay all cost in excess of the first year's estimated revenue, while others are willing to spend as much as three years' estimated revenue without expense to the customer, and in some cases where the customer has advanced a portion or all cost of the lines, such advance is refunded either as a percentage of his bills, in proportion to his annual use of the service, or in proportion to the new business added to the extension.

Most companies are supplying free maintenance service to ranges and water heaters for the period of the manufac-

* Committee on Electric Heating: F. H. Woodward, Chairman, A. Strauch, P. H. Booth, W. Wesley Hicks, B. Y. Gibson, W. W. Wier, Chas. Northcutt, J. F. Pollard.

turer's guarantee, after which some are charging list and some cost for the replacements, furnishing the labor free of charge, while in other cases, complete free service without limitation as to time is supplied without charge as long as the ranges and water heaters are operating on the system. Where the latter plan has been tried, it has had a very beneficial effect on the customer, and apparently the cost is a very small item as compared with the gross revenue.

Cooking and Heating Rates

A wide diversity of opinion exists as to whether cooking and heating rates should be in the form of certain blocks coupled with periodical minimum charges or whether they should take the form of service plus energy rates or should simply be a straight charge per kw-hr. for all energy consumed, with some normal periodical minimum charge. Those who favor one of the first two forms of rates, do so because they offer incentive to the customer to improve his load factor, while those who favor the latter, do so not because it is the most scientific, but because from a commercial standpoint it is the easiest for the customer to understand.

In order to determine the comparative results of applying the present electric cooking and heating schedules in actual practice a questionnaire was submitted to all of the electric companies in the Pacific Coast Division, asking for information as to the number of installations, the average consumption of each per annum, the average revenue from each per annum, the number of new installations during the year 1921 and the number of installations discontinued during the year 1921.

A careful scrutiny of the results which have been obtained by the several companies from the application of the different forms of rates brings to mind many questions which will be most interesting to hear discussed by the commercial representatives of the different companies.

Experience of Individual Companies

The Southern California Edison Company is probably the oldest in the field as regards the pushing of cooking and heating business and it has approximately 50% of all the range customers in this section, and yet its increase in range business during the year 1921 was 5½% only as compared with 15 to 30% increase of range customers of the other companies. This small increase may be attributed to the present policy of the company, since it has discontinued its direct sales efforts and is now relying upon the dealers to promote sales.

Another interesting phenomenon developed by this analysis is the fact that the average combination range and water heater customer does not use as much energy as the sum of the energy used by the range customer only, added to the water heater customer only. This is due to the fact that many of the water heater installations are in barber shops and other places of similar character, rather than in residences.

The number of ranges added on the Pacific Gas & Electric Company's system during 1921 was 25%, whereas the number of water heating customers only was increased 65%. This was due to a special effort to sell the water heater.

Apparently the Great Western Power Company has developed its commercial cooking load to a very much higher degree than many of the other reporting companies.

The Southern Sierras Power Company reports a very large number of small cooking and heating devices, indicating that it has apparently specialized on pushing this class of electric load with considerable success.

Undoubtedly a study of the figures will bring to mind many other interesting questions which may be discussed with profit by the commercial delegates at the convention.

The future development of rates for this class of business will probably be along the line of a reduction for large

consumption of energy, which may take the form of a discount on all energy consumed above a certain amount per meter per month, rather than a lower rate per kw-hr. Many think that such a course will serve the double purpose of encouraging water and house heating load, and will avoid the question being raised by power customers as to why they are not entitled to the same.

Another development under consideration is that of heating quantities of water during the valley period, usually at night, and storing this water for circulation through house heating radiators when needed. If such a system is developed commercially, the power companies can undoubtedly afford to offer a very attractive rate for this class of business.

The last available figures for all electric companies in the state of California are those for the year 1920, at which time the total revenue for electric business was approximately \$56,000,000. The companies reporting on their present electric cooking business for the year 1921 received \$847,000.00 from this class of business only, or about one and one-half per cent of the total electric revenue of all companies for the year 1920. The logical conclusion is that while the electric cooking and heating business is still relatively of minor importance as compared with the total business of other classes of customers of the power companies, it suggests great possibilities in the way of future development.

Electricity for Commercial Cooking

The development of commercial cooking in this district during the past year has been very gratifying as a whole. It has been difficult to ascertain reasons for this rapid development, due to its irregular progress and the lack of operating data available from the various power companies. Some power companies have made no effort to encourage this class of business, due to their inability to take on additional load or lack of a proper rate, while other combination companies favor their already established gas load. It would appear that none of the power companies of this coast have made any special effort to encourage this load, and in the majority of cases where any noticeable progress has been made, it has been largely due to the efforts of the manufacturer, backed by the successful operation of some local installation and assisted by the local power company.

One company reports two installations operating very satisfactorily at an average cost of 3¼c. per kw-hr. While the rate seems to be a trifle high, it would appear that the deciding factors are the quality and accuracy of baking, minimum space required, minimum labor for handling, cleanliness, etc.

Another power company reports one large restaurant of about 200 kw. in cooking and water heating equipment, but as this installation has been in operation but a short time, accurate data is not yet available. Periodical tests indicate a maximum demand of approximately 60%, and a cost of 1½c. per meal for meals averaging 47½c. each. This company also reports two electric grills operating with entire satisfaction.

Still another company with an installation having a 51-65-kw. connected load, shows an average return of \$160.00 per month with a cost per meal of 2½c.

One power company with 21 bake ovens, 50% of which were connected during the last year, reports the following:

Average connected load	16 kw.
Average kw-hr. per month.....	1875
Average revenue per month	\$47.35
Average cost per kw-hr. ....	.025 plus

Another power company shows nine additional bake oven installations made within the last year, with a rate that is higher than some companies offer for domestic cooking. One of those installations in a cafeteria shows an energy cost of 2/3 of 1c. on each dollar's worth of goods sold

at retail, while another installation shows the energy cost to be 2c. on each dollar's worth of goods retailed, the former turning out eight times the amount of bread and three times the amount of pastry, operating on the same rate and using the same size oven, which proves that operating conditions and proper equipment are important factors in controlling cost of operation.

It is evident that the bake oven load could be developed to assist materially in filling up the night valley, providing sufficient encouragement is offered in the way of rates.

Taking into consideration the above information without comment as to its desirability as a load by any of the power companies, it would tend to show that such installations should be carefully watched, and that it would be to their advantage to assist in the economical operation of such equipment by tying-in with the manufacturers. The manufacturers should keep in close touch with the actual operating conditions of such installations through the power company, and by so doing will materially assist in the development of cooking and baking in the future. The value of this cooperation cannot be over-estimated.

It has been pointed out in a previous section of this paper, that electric cooking has made considerable progress in the Pacific Coast Division during the past year. It is evident, however, that little was accomplished in territory where the power company did not lend its influence to furthering the idea. It would seem then that the successful introduction of electric cooking depends almost entirely upon the attitude of the power companies, since the public generally looks to that source for advice in such matters. If the company's policy is adverse, or only lukewarm, the public will be very slow in adopting it. On the other hand, if the company is enthusiastic and uses its influence to further the idea by recommending, advertising, making favorable rates and regulations, and selling on easy terms as well as encouraging the dealers to sell, very great success may be achieved.

Electrical Men in Electrical Homes

Without question, the attitude of the electrical industry itself has a marked effect upon the introduction of this service. As a rule the electrical men have been the most difficult to sell, and until such time as a majority of them will install ranges in their own homes and show that they really believe in electric cooking, they can hardly expect the public to adopt the idea on a large scale. However, it is pleasing to note considerable progress in this direction during the past year, since a large number of electrical men have placed ranges in their homes during that period. Every electrical man who electrifies his home becomes an enthusiastic booster, as does also his family, of the electrical idea and can do a great deal in the way of expanding the service.

To sell electrical ranges successfully the salesmen should be sufficiently familiar with the subject to be capable of discussing the matter with the prospective purchasers in an intelligent manner and to follow up the installation to determine that it is in proper operating condition; also, when necessary, to make such minor adjustments as may be required. The best results have been obtained where demonstrators have been employed to instruct the new user in the proper way of handling the range. With such instruction the customer usually finds the bills smaller at the beginning and immediately becomes enthusiastic over electric cooking. This instruction service is furnished free by most companies.

The Advantages of the Water Heater

Aside from being an absolute necessity, a plentiful supply of hot water is one of the greatest conveniences of a modern home.

The present tendency is to encourage the installation of a water heater with every range. If the user retains a coal or wood stove for water heating, quite likely the electric

range will be used only as an auxiliary, thereby reducing the consumption fully one-half, in addition to the loss of the water heating load. When an electric range is installed, the addition of an electric water heater, on a double throw switch, provides added revenue without additional expense to serve. When installed in this manner, the revenue derived from a range and water heater compares favorably with an equivalent load in motors. The average domestic customer maintaining automatic continuous hot water service uses about 450 kw-hr. per month, while one heating water only as required or intermittently uses but 150 kw-hr. per month.

In many cases the water heater will be of material assistance in closing a range sale.

The present tendency is toward the use of outside circulation type heaters up to 5000-watt capacity for domestic water heating. The circulation type heaters are favored because they rapidly accumulate a quantity of hot water at the top of the tank. The higher wattage heater is favored because it is faster, will heat a given quantity of water with the same expenditure of energy, and the first cost is very little more. A table for use in computing the time required to heat any quantity of water with standard size heaters follows:

Size Heater kw.	Time required to heat 1 gallon of water (Fig. at 100% eff.)	
	60-160° F. (Very hot)	60-110° F. (Bath)
1	15. min.	7.5 min.
2	7.5 "	3.75 "
3	5. "	2.5 "
4	3.75 "	1.87 "
5	3. "	1.50 "
6	2.5 "	1.25 "

Where flat rates are available, small capacity water heaters with or without thermal control are still used. These rates, however, are being supplanted by meter rates which sometimes divert customers to intermittent hot water service which is satisfactory only with high capacity heaters.

Installation of Heaters

Successful water heating depends to a large extent upon correct installation. In using electricity, one is dealing with a relatively expensive agent, but one which is capable of being used very efficiently, with the result that the operating cost will compare favorably with cheaper but less efficient fuels.

A 30-gallon tank will dissipate about 800 watts from its surface when filled with water heated to 180° F. with room temperature of 70° F. When insulated in 1-in. hair-felt boiler jacket, the loss is reduced to 125 watts. Assuming continuous operating for one month, the saving of 675 watts per hour amounts to 486 kw-hr. per month. Assuming an average rate of 2c. per kw-hr. this amounts to \$9.72, representing a monthly loss which can be saved by proper insulation.

It is important when installing circulation type heaters, that the bottom of the heater be located not higher than the bottom of the tank, otherwise it will be difficult to heat all of the water.

Some means of restricting the flow through circulation type heaters must be provided in order to get a rapid accumulation of hot water at the top of the tank rather than heat the whole tank to a uniform comparatively low temperature in a short time.

The thermostat serves to turn on or off the current automatically, eliminating personal attention to the heater, and, if desired, providing continuous hot water service with maximum convenience and economy.

Past the Experimental Stage

The standard electric water heaters of today are no longer experiments but are thoroughly reliable and will operate for long periods of time without repairs.

The demand for a limited continuous hot water service using standard thermally controlled heaters has led to the development of a simple, inexpensive "limiting valve," making it possible to keep one-fourth or one-half of the boiler contents continually hot, thus reducing the radiation losses.

This "limiting" valve consists of a long 1-in. tube which screws into the bottom center opening of the ordinary boiler. It terminates in a standard "T" valve which takes the place of the ordinary "T" generally used at the bottom of the boiler. An indicating arm or lever operates this valve, which in turn opens and closes ports located respectively at the top, center, and bottom of the tube, allowing water to circulate only through the open port, thence to the thermostat.

The demand for an electric water heater with the advantages of the faucet heater but without its disadvantages, has led to the development of a low wattage heater which provides a small quantity of hot water instantly available at the turn of the faucet.

This heater consists of a small copper boiler so thoroughly insulated that the radiation loss is negligible; it is provided with a 660-watt heating unit and a self-contained thermostat which maintains the temperature of the water at about 170° F.

The principal advantages of this heater are that it overcomes the objectionably large and sudden demand characteristics of faucet heaters of sufficient capacity to render good service, and reduces the cost of serving and wiring. These heaters are particularly adapted for the use of doctors, dentists, beauty parlors, barber shops, garages, offices, etc.

For use in localities where trouble has been experienced due to rapid accumulation of lime deposit, special types of heaters have been developed which automatically cause the scale to crack off and settle in the bottom of the heaters, from which place it can be readily removed.

A Good Field for Air Heating

The public demand for electric heat coupled with more favorable rates in our section, ample power supply, and increasing fuel costs has made it possible, with due care in the selection and installation of the apparatus, to heat successfully homes, hotels, theaters, offices and factories at costs comparing favorably with fuel.

The several styles and types of heaters used may be classified as follows:

Reflector type heaters, usually of small capacity, valuable chiefly for auxiliary heating or for local applications of heat in large spaces where for any reason general heat is not provided.

Radiant type heaters usually of 1,800 to 5,000 watts capacity adapted to heating homes and other places where the cheerful glow of the radiant coils is appreciated.

Convection type heaters, usually of capacities from 1,000 watts to 6,000 watts suitable for offices, theaters, stores, schools and factories.

Radiant-convection type heaters, which are convection heaters as well as radiant heaters, usually of capacities from 1,000 to 6,000 watts suitable for homes and offices.

Convection heaters of all capacities are made in the form of floor heaters, as well as portable heaters, and like the radiant convection type heaters, are available in the form of wall heaters and stationary heaters.

Electric steam radiators in capacities of 2 to 3.5 kw., portable or stationary, with automatic control.

Investigation of several air heating installations operating on standard heating and cooking schedules and depending entirely on electricity for cooking, water heating, and air heating, showed the following results:

- A 12-room home used 1760 kw-hr. in the coldest month of the year.
- A 10-room home used 1450 kw-hr. during the coldest month.
- An 11-room home averaged 2300 kw-hr. for the two coldest months.
- A 6-room home used 1110 kw-hr. in January.
- A 5-room home used 700 kw-hr. in December and 837 kw-hr. in January.
- A 12-apartment apartment house used 5,000 kw-hr. for air heating in January.
- A 30-room hotel providing continuous hot water to each room used 8112 kw-hr. in November, 8784 kw-hr. in December.

All of these buildings are equipped with heaters having sufficient capacity to take care of a temperature range of 30 degrees Fahrenheit.

Some advantages of the electric heating system follow:

The heaters may be controlled from a remote point automatically or manually.

Time switches may be used to control the system or any part of it. One or more rooms may be kept comfortable without using the entire plant.

Electric heaters placed in the room are 100% efficient.

Owing to the climatic and fuel conditions existing in California, electricity is destined to become a very important factor in the heating of buildings.

The Present Situation Summarized

The outstanding features of this report may be summarized as follows:

Development of the electric cooking and heating load in this territory is still in the formative period, though the past year has shown very satisfactory progress and the indications are that the year 1922 will be one of extreme activity in the direction of upbuilding this load.

It would appear that in certain sections at least the power companies and dealers are arranging to cooperate in the selling of the heavier appliances on a very much larger scale than heretofore. An ever increasing number of companies are realizing the desirability of this load and are making rates and regulations conducive to its growth.

The charts and tables tend to convey an idea of the possibilities in the way of revenue to be derived from this class of business.

The general tendency of rate revision is downward with a resultant growth of water and air heating load. During the fall and winter of 1921 the demand for electric air heating in some sections at least was surprisingly large, seeming to indicate that this class of business will increase very rapidly within the next few years.

Water heating shows a very satisfactory increase, indicating that it is rapidly assuming important proportions.

During the year there was a marked growth of commercial cooking and baking, indicating that with some encouragement this very desirable load could be built up to where it would become an important factor as a revenue producer.

The revenue from cooking and heating for the year 1921, as shown by the California companies reporting, was \$847,000.00, or 1½% of the total revenue for all companies in the State of California for the year 1920.

Most companies are furnishing some sort of free maintenance service which is apparently quite necessary at the present time to introduce the electric idea successfully on a comprehensive scale. An ever increasing number of electrical people are installing electric cooking and heating in their homes, which is the most convincing proof that they believe in it and can conscientiously spread the idea.

There have been improvements and new developments in practically all the heating and cooking apparatus, especially in the line of better heating units and improved water heaters.

Increasing the Use of Electricity for Cooking

The Committee would like to offer the following suggestions which they believe would materially assist in introducing the electric cooking and heating idea on an extended scale.

First. That all power company officers and employees, as well as others engaged in the electrical industry make a special effort to install electric cooking in their homes, and that the power companies, manufacturers, jobbers, and dealers make such prices and terms to their employees as will encourage them to do so.

Second. That the power companies, manufacturers, jobbers, and dealers cooperate and advertise this service extensively in such mediums as will reach the most people, fearing the fact that the electric home is the most modern and proper today.

Third. That the power companies cooperate with the dealers in the selling of this equipment to the end that everyone will be boosting the sales and that all power companies and dealers make as extensive displays as possible to impress the public with the idea that the apparatus is in general use.

Fourth. That all employees having to do with the sales of appliances be so familiar with them and the subject of electric cooking that they can intelligently discuss the matter with the prospective purchaser and answer such questions as may be put to them, and that as much information on the subject as possible be given to all other employees of the power companies and dealers, to the end that when they are asked about electric cooking and heating they can answer correctly and not discourage the interested party by replying that they know nothing about it.

Fifth. That some instruction should be given to each new purchaser of a range in its use; this instruction to be given by a woman, generally an employee of the power company. This is considered very important in order to show the new purchaser how to use the range to the best advantage and to secure the maximum efficiency.

Sixth. That some sort of free maintenance service be applied by the power company, the apparatus to be kept in first class operative condition with little or no expense to the customer. This will always make a satisfied customer and booster.

Seventh. That the power companies give serious consideration to the subject of rates to encourage this class of business, for it has unlimited possibilities for the production of revenue if properly handled. It would appear that since practically all heating apparatus operates at unity power factor, that with an equal load factor, heating should be entitled to preferential rates. It would also seem possible to encourage certain heating loads by offering discounts for power used at night when practically all plants are lightly loaded.

In conclusion it may be stated that your Committee has endeavored to show as accurately as possible just what the cooking and heating situation is today in the territory of this Association, and to offer such suggestions as it believes will most rapidly and satisfactorily increase the business.

Why City Streets and Highways Should Be Better Lighted

Good Business Principles Demand the Adequate Illumination of Down Town and Outlying Districts, as well as the Utilization of Highways at Night — Sub-Report of the Commercial Committee

GEO. T. BIGELOW, Chairman*

Street and Highway Lighting

With the exception of a few of the larger cities, high intensity street lighting has not been developed and highway lighting is in its infancy.

The increased use of street and highway lighting is far short of the advances that have been made in the development of equipment.

It would seem obvious that discussion and papers by the Commercial Section of this organization should stress those features of the work that have to do with the selling of equipment and the loading up of lines, rather than those features which have to do with the technicalities of getting certain desired results in the way of electrical efficiency. The latter problems are ones that of necessity must be handled by the Engineering Section; consequently it would seem proper that this paper should deal with those advantages accruing to municipalities through increased use of street lighting and to the power company in the development of this load. The manufacturer and jobber will, as a matter of course, be taken care of if the needs of the other two are sufficiently great.

Advantages to Power Companies

The advantage to a power company of the night load for street and highway lighting would be very considerable in the West. The electrical industry is very prone, probably as a matter of tradition or connection with the industry in other parts of the United States, to take it for granted that the peak load of the power company is an evening load. In California this is not the case, as on nearly all the larger systems it will be found that the peak load comes on in the middle of the morning and in the middle of the afternoon, at least during the summer months. With some of the companies, this is probably true during the whole year, while some of the larger companies, during the winter months, have a peak ranging from 5 o'clock to 8 o'clock in the evening. Even with these companies, an evening load may probably be considered as a very good one for the reason that any peak that it might create in the evening will not exceed the summer peak that comes on during the day, and it would therefore require no increased production capacity in order to take care of it. Such a load, in all cases, would go a great way toward helping to fill that valley which occurs after the early evening peak and continues on through the night hours. This load is also one that brings a good rate and with the modern trend of cities to install ornamental systems of the individual type, a large part of the investment is borne by the municipality rather than by the company. There would seem no question but what the load is a paying one from the standpoint of the central station.

Better Public Relations

There is another point, which from the standpoint of the power company, is of great value. At no time in the history of the industry has there been greater necessity for cordial relations between the public and the power company than at present. With an increased use of electricity and the complications that necessarily arise through the rates and regulations under which the companies now work, there is an even greater field for dispute. In bettering power company relations with the community, street and highway

lighting may play an important part. After the first cost of installation and the publicity attendant upon it, the public is very apt to forget that the type and extent of the lighting system installed is solely the selection of the city officials. It therefore naturally follows, that if the system installed does not give well-lighted streets, as soon as the novelty of it has worn off, the people will blame the central station for the result. No amount of explaining can effectually keep this out of the public mind. On the other hand, if a system is installed which gives well-lighted streets and an artistic appearance, the people will always have in mind the power company in giving the credit for this efficiency. With this in view it should be the endeavor of each commercial man connected with the electrical industry, who has to do with the installation of street lighting systems, to endeavor to sell to the municipality that system which will give them the best results, rather than a system which will merely "get by" a present demand for some form of street lighting or meet the political expediency of the city government. Naturally city governments like to show their people that they are giving an economical administration, and with the necessity of voting bonds for forming a lighting district, there will always be a tendency to limit the expenditure. It should be clearly impressed upon each one of the industry not to give way to the easiest method by making the sale of an installation that is insufficient to the needs and dignity of the city, merely because it can be gotten over with less effort. The proper method undoubtedly should be to lay down a plan that meets every need of the city, not only from the standpoint of lights, but one that will satisfy the people from the artistic standpoint and will give them a pride in the results obtained. This feeling will remain long after the first cost is forgotten and sufficient effort on the part of those selling can bring this about. It must be kept in mind that if an inefficient system is put in, there is sooner or later bound to come a change. It is probably more true in street lighting than elsewhere, that the whole system installed must be junked when a new system is put in—and if this takes place, the power company is going to get the blame for it. It is not human nature that the city officials should take the blame upon themselves.

With the above point in view, it would seem than any effort to increase street and highway lighting, no matter how great, is well worth its cost.

The advantages of good street lighting to a municipality are so many and varied that it would seem to open up one of the best fields in the power industry. Any general reading of the newspapers brings out the fact that wherever ornamental systems of lighting are being installed, they are one of the boasts of the city. Probably no other form of civic improvement is more calculated to give civic pride to the citizens. This feature is generally brought out in Chamber of Commerce advertising, and it can be taken for granted that there is the desire on the part of the people for good street illumination. We, therefore, have one of the first and most important points of selling—that is, the natural desire of the buyer for that which we have to sell; and this is made the more valuable in that the money is not directly spent of the pocket of the buyer, and civic pride will take him further along in this than it would if he were making the expenditure directly.

*Committee on Street and Highway Lighting: Geo. T. Bigelow, Chairman, R. M. Alvord, F. E. Boyd, F. C. Piatt.

In the second place, every one knows the different impression made by a well-lighted and a poorly-lighted town. Nothing is more characteristic of the run-down and unprosperous town than its street lighting. On the other hand, nothing is more indicative of a prosperous town than well-lighted streets; in fact, the greater the intensity of the street lighting, the greater is the endeavor of the business blocks to keep pace with it, and with it all comes an increased value to property that is money in the pockets of the citizens. There is no question of the increased value to property immediately after the installation of an efficient and handsome lighting system. This applies with equal force both to residential and business property.

In addition to the advantage of increased value, there is also a great return to the city in the increased protection which is afforded by proper lighting. This is not a far-fetched proposition, but is an actual return of value on investment in increased lighting. Proper lighting is recognized everywhere as an aid to police protection.

With many cities now having a City Planning Committee as a regular department, it should be a far easier matter to instruct the government in ornamental systems,—as with modern trend of thought, proper lighting must be one of the most vital factors in this work.

The cost of street lighting on the average is at present a very small part of the actual cost of city government. Figures prepared by Mr. A. F. Dickenson show that of every dollar spent by municipalities of over 30,000, only 3.4c goes for street lighting. To state it another way, the average amount per capita spent by municipalities of over 30,000 population is \$21.23, and of this only 72c is spent for street lighting. This is no great proportion of city expenditure. We find the 50 best lighted cities spending over \$2.00 per capita, the highest being \$4.81,—and while the largest cities may show a low per capita, this can easily be traced to congested population and small area. With these figures in view, it would seem not a difficult matter to induce a greater expenditure for this class of service.

Utilizing the Highways at Night

In no place in the country are the highways of more importance than in California. Wonderful roads combined with climatic conditions allowing truck and passenger traffic all the year, have brought the volume of traffic up to a point where it is most dangerous. Any spread of this traffic on the hours when the road is not congested would be of immeasurable benefit—a situation which can only be achieved by inducing night travel of trucks. At present the night driving is especially dangerous, as in the glare of approaching headlights all view beyond is cut off. Anything that will reduce the glare and give a great diffusion of light over the whole road will be worth all the money put into it. The high intensity lighting of city streets is not needed here; greater spanning can be used, all tending to the greatest economy. Already various new methods have been advanced which apparently give good results—such as center-hung parabolic reflector type, throwing the light up and down the highway, the light behind carrying the driver through the glare of the light approached. With this field scarcely scratched, it should behoove all commercial men to keep and urge upon the engineering force to perfect a system for this type of lighting.

Modern developments in glassware have been so swift and varried that it is impossible to recommend any particular form to the exclusion of all other units. Each salesman must carefully study the different types and apply them to the conditions presented. No greater mistake can be made than to expect one type to meet all conditions. Varying surface conditions of the roadways need different degrees of light. Any salesmanship which does not take these factors into consideration, will be detrimental to the industry.

The keeping in mind of the particular problem is most essential if desirable results are to be obtained, and as mentioned above, desirable results here are important to the industry beyond the actual revenue received.

Certain essentials are necessary for down-town lighting; here the problem is to make it possible really to see, as the mere distinguishing of objects is not enough. Lights should be placed at a sufficient height so that the sides of the buildings as well as the street surface will be brilliantly lighted, and nothing short of high intensity is desirable. Spans should be shortened in order to give a continuity of this brilliancy.

As we leave the business district and come to the residential streets, much wider spans can be used and lights may be lowered considerably. Spans should not, however, be of such length that there are dark intervals between lights and the intensity should be sufficient to detect still and moving objects readily.

On the highway, especially with the long distances of California, it would seem best not to have any set method throughout, but to vary spans with the needs of the road, making the lights more in the nature of markers for the straight-aways and bunching them more on curves and dangerous places, and varying their intensity accordingly.

It is hardly proper or feasible for this paper to lay down particular methods for lighting, its purpose should be rather to show the people in this field the value of this load, leaving particular problems for the individual salesman.

Campaign for Better Lighting

During the past five years the installation of improved lighting systems in the various cities has fallen far below a healthy, normal growth, due chiefly to the war and its accompanying economic disturbances. Conditions have now returned to a workable normal, and the time is ripe for aggressive action on the part of the power companies in stimulating better street lighting.

This can best be done by the thorough analysis of the situation in each town or city by men technically and commercially qualified to lay out an adequate, economical and practicable lighting system, suited exactly to the needs of the city.

Because of the war time slump in street lighting activity, in many companies the personnel of the commercial department does not now contain men fully qualified to handle the street lighting work. To these companies, particularly the large companies, we earnestly recommend the employment of at least one properly qualified man who shall devote his time to the preparation of street lighting plans, working at all times in conjunction with the city authorities or merchants' associations, and endeavoring to bring about ideal street lighting conditions throughout the territory served.

The manufacturers and dealers could, and should, fully cooperate with the power companies so that both would be fully advised as to present or proposed street lighting activities.

Practical Demonstration of Lighting

It has been found from experience that nothing is so convincing to the city authorities, where a new system of lighting is proposed, as an actual demonstration of the units on a sufficient scale really to show the effect; i. e., not merely one or two units should be installed, but rather blocks should be lighted up, making use of temporary connections to give the full results of the proposed plan. The power companies might find it advantageous to approve expenditures for this work, and manufacturers might find it profitable to lend equipment for the purpose.

If the subject is given the consideration it would seem to merit, 1922 should show some excellent results for all branches of the industry.

Pacific Coast Electrical Association 1922 Convention

Southern California Offers Many Attractions to the Delegates from Every Branch of the Electrical Industry Who Will Take Part in Annual Sessions in Los Angeles May 31 and June 1-2



Elaborate plans have been made for the entertainment of the many guests who will attend the convention. On the last day of the convention all who have registered for hotel accommodations will be taken on a free trip to Catalina Island which is pictured above. Seal Rocks, Moonstone Beach, the Chinese Pirate Ship and other points of interest will be visited.



A convention is not a convention without golf. The Ambassador Golf Club is maintained exclusively for the guests. Its 18-hole course will provide ample entertainment for the males.



The lobby of the Ambassador is one of the most spacious and richly furnished of any hotel in the West. The shops, theater, swimming pool and banquet hall all open into it.



The \$5,000,000 Ambassador Hotel where the convention will be held is a city unto itself. It contains exclusive shops, a motion picture theater, swimming pool, art gallery and many other features. It is situated in an exclusive residential district overlooking the entire city.

How Much Should Consumers be Charged for Electric Service?

What is the Fair Thing for the Power Company to Charge for Electricity and Why It is Cheaper to Purchase It from the Central Station than to Make It for Yourself—Report of the Rate Research Committee.

E. B. CRIDDLE, Chairman *

Every industrial plant of the West is concerned with the cost of electric power, whether it is cheaper than steam or Diesel engines and whether, if the power company is the source of supply, the rates fixed by the Power Commission are fair and equitable. The entire subject of the costs of electric service is here discussed by a committee of power company men from the standpoint of the principles which should govern rate schedules.

1. Demand Factor.—(a) What proportion of the cost of service of the different classes is due to fixed charges or readiness-to-serve?

This proportion varies to a great extent with different companies and for different classes of service. It can be said that a large proportion of the total costs are fixed charges and that a rate which attempted to make a demand charge follow closely the demand costs would not be acceptable to the public.

(b) To what degree is this modified as to individual consumers, by the system diversity?

System diversity is known to relieve greatly individual consumers from the expense of maintaining excessive equipment. Farther than this it is impossible to state at present. The subject is a broad and important one and this committee recommends that investigation along this line be pushed by future committees.

(c) Do the present types of rates lay too much stress on the "readiness-to-serve" costs?

Generally speaking, the "readiness-to-serve" charges are given too much importance in rate schedules. The average customer does not understand the readiness-to-serve charge. There seems to be prevalent the idea that a "readiness-to-serve," plus an energy charge, constitutes a duplication of charge—that the consumer is paying twice for the service he receives.

Where the "readiness-to-serve" charge amounts to a large per cent of the total bill, the schedule approximates a flat rate charge per hp. If such a schedule gives a reasonable resultant rate per kw-hr. for the long hours user, it will produce too excessive a rate per kw-hr. for the low load factor consumer.

The maximum demand meter is not as accurate or dependable an instrument as the integrating kilowatt-hour meter. Its lack of consistent performance leads the consumer to doubt the charges based upon its indications, especially where the major portion of his bill is calculated on the registrations of the demand instrument. They, however, can be used to advantage for large installations, especially for installations where a great number of motors are installed and when the consumer is able to control his demand by limiting the number of motors in use at any one time.

2. If such costs are to be considered, can they be properly cared for in block schedules?

For operations above any certain load factor, block schedules can be made which will result in exactly the same revenue that is derived from the demand and energy type of rates. Demand and energy rates make ordinarily excessive rates for low load factor operations especially with small

installations and consequently it has been found necessary to make an optional block rate for this class of consumers. By adjusting the size of block and rate in a block schedule any figure of revenue, within practical limits, may be had for any number of kw-hr. delivered. It therefore appears that a block schedule with an adequate minimum charge can be made to yield the same result as the demand and energy type.

3. Can a given revenue be secured, equitably distributed between various classes of consumers, without antagonizing the public through forms or types of rates?

Rate schedules for the sale of electric service should conform, so far as possible, in form or forms, to the needs of the consumer. This end can be accomplished by suitable forms of schedules which will be acceptable to the consumer.

The rate structure should possess the following characteristics:

(a) It should yield the total amount of revenue required to give a fair return on the property.

(b) It should be of such form, or forms, as will permit the consumer to buy service in a manner best suited to his needs.

(c) Each schedule should be simple in form.

(d) There should be as few a number of schedules as is consistent with the above requirements.

4. Readjustments. Is it favorable to change the present adjustments to small consumers with low load factors, whether for light, heat or power, and make up the loss so created by raising the rates to the large consumers with high load factor, or vice versa? Justify the conclusions by business reasons, and show that such changes will not cause loss of business.

There are five essential things to consider in the making of rate schedules for electric energy furnished to consumers where such rate schedules are based on load factor. These five essentials are:

(a) Value of service to the customer.

(b) Cost to the company to serve the customer.

(c) Cost to the consumer to obtain the same service with his own equipment.

(d) Size of plant necessary to take care of the customer's demand.

(e) Public policy in rate making.

In analyzing the difference between the rates charged to high and low load factor consumers, the above items must be taken into consideration.

The value of service to the customer is the thing which is desired when he installs service, and he considers whether or not the service value is equal to the cost to him. There is no doubt that the service value to an electric lighting customer in the home is equal to many times the cost which he is now paying, and he would not do without this service if the cost were trebled.

The customer having decided to purchase the service, the company must not sell this service at a loss, thereby placing a burden on other classes of customers upon the line. However, the company should sell at a low increment of profit, so that it may compete favorably, or be lower than the customer can manufacture the same service with his own equipment.

In studying the point to which a rate can be lowered in order to compete with the isolated plant, it should be remembered that it is not necessary for each class of service to

* Rate Research Committee: E. B. Criddle, Chairman, I. H. Lecklider, M. E. Newlin, A. E. Holloway, J. F. Jackson, F. L. Piatt, J. B. Black, Lloyd Henley.

yield the same profit, and that competition and the economic value of service should be considered.

Necessarily the size of the consumer's plant served by the company will increase or decrease the company's cost to serve him, even though he uses no service.

Last, but not least, the public policy of having low rates for service to low load consumers, such as residence lighting consumers, has a definite bearing upon the attitude of the general public toward the company serving that community.

A considerable difference in the rates charged to high and low load factor consumers can be justified by all five of the above points, and the lowering should be made first to the high load customer, so long as he carries his just proportion of the cost.

5 Reasons which can be presented to the Railroad Commission, why uniform types of rates for various classes of service should be used by all companies, and why it is undesirable to change the type from time to time, on any one system.

We assume that it would be apparent to all those interested that the most desirable condition would be where types of rates for various classes of service are used by all companies, particularly within a State or section where the interests of the various companies were closely allied. If this could be effected, it would appear that many advantages would accrue, and this would eliminate a great deal of the present dissatisfaction among consumers of the various companies, particularly among those having interests in the territories of different companies, and those consumers of different companies coming in contact with each other. It would also tend to bring about a closer relationship between companies through a better understanding of the rates, rules and regulations of each.

Of course, it must be taken into consideration that there may be a very wide diversity of conditions between various companies, even on the same class of service, and this might make it necessary for one company to employ a certain type of rate which would not be advantageous to other companies.

Everyone will agree that it is undesirable to change the type of rate from time to time. This, however, unfortunately has been unavoidable in the past, as rate making has been to a large extent in the formative stage and it has been necessary, in order to meet the requirements of varying conditions, that a certain amount of experimenting be done. In fact, we are at present to a large extent in the experimental stage in our endeavor to formulate rates which will be of the simplest type and will still meet the requirements and give the results desired.

6. The most desirable type of schedule, with reason for each, for different classes of service.

Any statement of the most desirable rates, is a question which will of course, invite some argument. It would seem, however, that in order to simplify the rate system and reduce the number of rate schedules to the minimum, that the following should meet with the approval of those interested:

(1) **Lighting.**—A combination rate for domestic and commercial lighting which should be a kw-hr. rate suitably blocked so as to fit any and all lighting conditions.

One rate for both commercial and domestic lighting service would be preferable for the reason that in a large number of cases where there is more than one rate applicable to this class of service, the kw-hr. use is such that it is very hard to determine just what rate would be the most beneficial for the consumer, and this tends to cause dissatisfaction among consumers.

(2) **Outdoor, Street and Highway Lighting.**—In those installations where the company owns, maintains and operates a lighting system for a City or County, a flat rate based on the size and type of unit employed and the number of hours burning is preferable for the reason that in dealing with municipal or county governing bodies it is advantageous to be able to quote some such rate so that they can more easily budget their expenditures, and as in such cases the style and type of unit and the number of hours burning can be absolutely controlled by the company, there is no disadvantage to the company.

However, on those systems owned, maintained and operated by the municipality, such as in the case of most electrolier systems which are installed under the City Improvement Act, where all maintenance is done by the municipality, such service might be metered and charged for on a

kw-hr. rate, suitably blocked so as to take care of the possible variation in load factor.

(c) **Cooking, Heating and Water Heating.**—Under this heading there should be two schedules,—one providing for combination lighting, cooking and heating for domestic use, in which should be provided the primary high block to take care of the house lighting use. Second,—a commercial schedule which should eliminate the lighting block, as commercial lighting should be in all instances served separately from either cooking, heating or power installations, where that latter is used commercially. Both of these rates should be suitably blocked so as to take care of the varying load factor conditions.

(d) **General Industrial Power Service.**—A rate for this service should be a kw-hr. load factor rate with suitable blocks, based on the installed capacity, with the possible exception of load in excess of 100 to 200 hp. where there may be quite a large diversity. In this latter instance, the block is determined on a basis of maximum demand and an optional provision might be made allowing a demand plus energy rate, with a suitable minimum charge.

(e) **Agricultural Power Service.**—There is some question as to the most advantageous type of rate applicable in this class of service as conditions in different localities and on the systems of different companies have such a wide diversity. For instance, the use of agricultural power for irrigation purposes in the San Joaquin Valley is so much more general, and generally of such a greater duration, that the type of rate which might be more desirable in this locality might prove entirely undesirable in other localities.

It would seem, however, that on those installations whose use was less than 1,000 kw-hr. per hp. per year, a kw-hr. block rate would possibly be more desirable. However, on those installations where the use is greater than 1,000 kw-hr. per hp. per year, a "readiness-to-serve charge," to which would be added an energy charge commencing at a comparatively low rate and followed by reduced blocks at suitable intervals so as to give the advantage to the long term user, might be the most advantageous. However, as mentioned in Sections 1 and 2 of this report, there are several disadvantages to Demand and Energy schedules, and considering the fact that a block rate can be made to yield the same result, agricultural consumers in many districts will undoubtedly be much better satisfied with the block type.

In general, farmers find more difficulty in understanding the demand and energy type of rate than any other class of consumers and this lack of understanding not only causes dissatisfaction but tends to curtail operations. For this reason it would appear that a more satisfactory plan for agricultural consumers would be to have a monthly block schedule with the blocks based on horsepower of connected load, for low annual load factor operations, for example:

First 150 kw-hr. per hp. per month	2.5c. per kw-hr.
Over 150 " " " " "	1.5c. " "

and carrying a sufficient annual minimum per horsepower of connected load, which should be prorated over those months of heavy operation.

For higher annual load factors a block schedule based on annual consumption per horsepower of connected load is more satisfactory to the average farmer than a demand and energy rate, for example:

First 1000 kw-hr. per hp. per year	2.0c. per kw-hr.
Next 1500 " " " " "	1.5c " "
Over 2500 " " " " "	1.0c. " "

and carrying a sufficiently high annual minimum charge to exclude low load factor consumers from enjoying the lower rate of the first block with consequent insufficient inducement for higher load factor. Care must be taken that the rate in the first block is not so high that it will be prohibitive during the first months of the operating season.

Both of the above might carry a clause interpreting connected load for large installations, say over 200 hp. and of more than one motor, as the maximum demand during any 15-minute interval occurring during the previous year.

(f) **Oil Field Service.**—In general power conditions in the oil fields are such that there is less variation in load factor than in any other general class of business, and for this reason a kilowatt-hour rate would not be objectionable and would seemingly give the best satisfaction both from the standpoint of the consumer and that of the company.

7. In competitive territory what adjustment of rates should be made?

Where the lines of two or more distinct companies are contiguous with each other and result in a competitive situation, the rates, of necessity, must be identical if one company does not wish to lose its business to the competitor. The question of which rate should apply depends somewhat upon the local situation. In general, however, the higher of the two rates should apply. The Railroad Commission has indicated the minimum rate which the companies in question can charge and yet do business on a sound basis. If the company with the higher rate finds itself compelled to meet a lower rate through competition in a considerable portion of its territory, the actual return will not approach that which has been estimated as the proper basis and consequently must suffer. The fact that several companies under like conditions have considerable variations in their rates indicates that the company with the lowest rate does the largest volume of business. The added revenue to the large company through adopting the higher rate in the competitive territory would be negligible as compared with the lost revenue to the smaller company if it were forced to meet the lower rate. It would

therefore appear that the Commission should give due consideration to competitive situations when establishing rates, make the lower rates conform to the higher in competitive areas and place any credit to the consumers of the lower rate company instead of penalizing the general consumers of the higher rate company to make up losses due to lowering the higher rate in these areas.

8. Should rates to municipalities or to small local companies for resale, be made the same as, or higher or lower than, the rates to power consumers having the same load factors and consumption? And why?

It would be a difficult matter to justify discrimination between the rates to municipalities and rates to local companies for resale, as against rates to other power users. It is self-evident that any consumer, large or small, municipality privately owned utility, or otherwise, should be able to purchase energy at as low a price as any other company, if under like conditions and in like quantities.

Special privileges to one customer place a corresponding burden upon other consumers. Discrimination between consumers where conditions are practically identical should not exist, and the same rate schedule should be applicable either to municipality or privately owned utilities for resale service and to power consumers having the same factors and consumption. The incentive for a lower rate should be found in a reward for quantity, load factor, and other conditions which are brought about through intelligent effort and which, in themselves, earn the lower rate. This opportunity should be open to all and not to any one consumer, placed in a favorite position not available to others, especially if such favorite position is not earned or merited, but is obtained at the expense of other consumers.

9. Should rates to municipalities for municipal service, whether for lighting or power, be higher or lower than to others under similar service conditions? Why?

Assuming the line of reasoning given in answer to question No. 5, to be logical, then, based upon the same reason, rates to municipalities for municipal service, either for lighting or power, should be identical with the rates to all classes of users under similar load factor service conditions.

Of course, the question of expediency is bound to enter in and it may be necessary to discriminate as between various classifications of business, in order that all available business may be secured, good system load factor attained, a greater diversity secured and the general prosperous condition brought about which will benefit all consumers.

10 Territorial Differences. To what extent are territorial differences in rate schedules justifiable or desirable when the costs fully justify same?

Territorial differences in rate schedules depend entirely upon the territory served. From a cost standpoint only, territorial differences in rates would be based entirely upon the distance from the source of supply. On this basis the rates in a district would theoretically be put on a zone system, which we all know is not good public policy.

Communities that are tied together and whose interests are identical, if surrounding a central station which feeds them from one source, should receive the same rates for service for the following reasons:

(a) Because their interests are identical, anything that benefits one part of the community, benefits the whole.

(b) Because the expense necessary to segregate and divide the districts and bill same, would increase to such an extent that the difference in rates that could be charged would not increase the net revenue to the company to any marked degree.

(c) By giving the same rates to inter-dependent communities, a good feeling among the customers is created and rate discussions between communities are kept down, which tends to lessen rate agitation upon the system as a whole.

If the community interests are not entirely identical and inter-dependent and the margin of difference in the cost

to serve too great, there should exist a difference in rates; but the difference in the cost to serve should be plain and readily understood by the average citizen. It should be remembered, that no community should be served at a loss, thereby causing a burden upon the other districts attached to that system, and that all classes will have lower rates when a saturated condition exists.

There is no doubt that the consumer cost, the transformer loss and the fixed charges on transmission equipment, increase as the distance from the center of distribution increases. However, the small amount which the rates could be increased over those within the central district, would not repay the utility for the increased dissatisfaction among its customers by having rate discussions between communities which are entirely inter-dependent.

11. Isolated Plant Competition.

In the establishment of power rates the question of the cost of competitive forms of power is a prime factor. Competition must be met to hold business, but in determining the "value of service," or local cost to produce, every item of cost and loss must be considered.

At times and with some power users it is necessary to bring to bear all possible arguments in favor of electric service in order to obtain and in some cases hold the business. Central stations should keep in sufficiently close touch with the progress of competitive types of power, so that any arguments or cost data in favor of other power may be anticipated and questions raised be fully answered before any serious consideration is given the competition.

The various forms of power which will from time to time demand the attention of central stations, are tabulated below in their relative importance as to electric service competition:

Internal Combustion—Diesel; Semi Diesel.

Internal Explosion—Natural Gas; Gas Producers; High

Gravity Oil.

Steam—Turbine; Reciprocating—Waste heat, oil, coal.

Diesel and semi-Diesel engines afford the keenest competition to central station service although a thorough knowledge of engine operations and costs by central station men should eliminate losses from this source.

This will also be true of internal explosion engines. With natural gas engines the cost of gas in some localities is as low as from 1/3 to 1/2 the cost of electric energy, but when the full fixed costs, including high depreciation and repairs on the light engines used and added labor charges, are shown, very few will be tempted to flirt with the experiment.

There is very small cause to anticipate steam competition from oil or coal fuel while much higher thermal efficiencies obtain in Diesel or gas-producer engines. However, some engineers claim for steam generated power, through the medium of waste heat, from cement mills, reduction furnaces, etc., a cost under 7 mills per kw-hr. This cost is based upon heat at no additional expense above that necessary to the operation of the plant regardless of what power might be used, and the entire possible output of energy is credited against the costs. Power companies on this coast have had to pay small attention to this form of energy and consequently little cost data is available regarding same. All possible available information should be gathered by central stations against the time when it might be seriously considered.

In general it has been found that in cases of the consideration of engine competition, a few statements of electric convenience, comparatively small capital investment, continuity of service, very much smaller depreciation, maintenance and labor charges and the instability of the oil market are quite enough to dispel any ideas of lower costs. The attention of the farmer should be drawn to his lack of knowledge of a modern engine; his inability to make his own repairs

A full inclusion of all costs will show an average rate considerably in excess of that shown by the central station. It should be noted that the total figure of cost estimated by the engine salesman includes approximately 30% of the costs which would, in the end, have to be borne by the customer.

250-kw. Installation
Investment and yearly cost of Oil Engine Plant operating ten hours daily with maximum Load of 200 kw. and 25% Daily Load Factor.
331,200 kw-hr. production per annum.

Investments—	Oil Plant
One 360 hp. Diesel Oil Engine.....	\$35,810.00
One 250-kw. alternator and exciter.....	5,325.00
Storage oil tanks.....	1,500.00
Foundations, installations, etc.....	6,000.00
Wiring	500.00
Total Investment	\$49,135.00
Yearly Operating Costs—	
Interest at 8%.....	\$ 3,930.80
Depreciation at 10%.....	4,913.50
Insurance and Taxes at 2%.....	982.70
Fuel Oil—27,600 Gallons at 5c.....	1,380.00
Labor—1 Engineer and 1 Helper.....	3,500.00
1,300 Gal. Lub. Oil at 50c.....	650.00
Cooling Water.....	541.00
Waste and Supplies.....	300.00
Repairs, 1%.....	358.10
Breakdown Electric Service (used 3 times per year)	1,905.00
Total Cost.....	\$18,461.10
Cost per kw-hr.....	5.57c

Semi-Diesel Oil Engines		
	100 hp. Installation 6 mo.—100% Load Factor Engine	50 hp. Installation 6 mo.—100% Load Factor Engine
First cost installed.....	\$8,659.90	\$5,363.00
Annual fixed charges—		
Interest	7%	7%
Depreciation	10%	10%
Repairs	7½%	7½%
	24½%	24½%
Total Annual fixed charges.....	\$2,121.67	\$1,313.93
Operating Costs—		
Monthly kw-hr. 54,820		
183 bbl. 28° Beame Fuel Oil at \$3.50,	640.50	364.00
122 Gals. Lubricating Oil at 50c.....	61.00	36.50
Total Monthly operating.....	\$ 701.50	\$ 400.50
Total operating for 6 months.....	\$4,209.50	\$2,403.00
Total annual fixed charges.....	2,221.97	1,313.93
Total Costs for 6 months.....	\$6,330.67	\$3,716.93
Average cost per kw-hr.....	1.92c	2.25c

Holt Natural Gas Engine	
45-hp. Engine, 6 months, 80% Load Factor	Engine
First Cost Installed	\$2,150.00
Annual Fixed Charges	
Interest	8%
Depreciation	15%
Repairs	8%
Taxes and Insurance	2%
Total	30%
Total Annual Fixed Charges	\$ 645.00
Operating Costs	
Production — 19,200 kw-hr.	
Gas Consumption per month, 328,950 cu. ft.	\$ 174.00
50 gal. Lubricating Oil at 50c.....	25.00
Labor, 1 hr. per day at 40c.	12.00
Total cost operating per month	211.00
Total operating for 6 months	1,266.00
Total annual fixed charges.....	645.00
Total annual costs for 6 months run	1,911.00
Average cost per kw-hr.	1.66

This set up embraces low rates for gas, which are in effect now but which gas companies refuse to guarantee for over 30 days. The engine considered is a cheap affair and should be charged a greater depreciation. This line-up, however, is used quite generally by the gas and gas engine people.

This is such a big subject with so many ramifications, that your Committee suggests that this very general report be received as it is intended, as a mere starting point, and that the subject be referred to a new committee or various committees next year, to give a more detailed study and analysis of the various phases here touched upon.

Expansion of Waterwheel Runner and Coupling Electrically for Fitting on Shaft

By G. H. BRAGG
Hydraulic Power Committee

A new method of heating a water wheel runner and coupling by induction for shrink fitting on the shaft was used in connection with the No. 6 unit at the Colgate Power House of the Pacific Gas and Electric Company. The job was done



General view of windings on runner before laying it on its side and boxing in.

more easily, quickly and cheaply than by any of the usual processes of heating or pressing heretofore used for such work.

The rotor comprised two spiders side by side, attached at the periphery only by means of the chain type bucket assembly. The hubs were not locked by means of dowels or otherwise so as to maintain the alignment of bore or keyway in case of uneven heating. The source of power was a 900-kva., 2200-volt, 3-phase, 60-cycle, 360-r.p.m. water wheel driven generator. The generator was run at the reduced speed of 345 r.p.m. and excitation cut down to give the desired voltage, power being taken directly from one phase of the generator to the heating coils.

Approximately 350 ft. of 118,000 C.M. copper cable (cable from discarded armature windings which was available) was wrapped about the rim of the spider through the interstices of the bucket assembly, insulated between turns with asbestos sheet, 85 turns in all.

In the preliminary test, the current was raised from 50 amp. to 300 amp. within a half hour. The temperature rise at the rim was obviously too rapid, indicating that the heating should be slower to allow for proper conduction to the hub and to prevent possibility of damage due to internal stresses. The potentiometer was set up with one thermometer at the hub and two at different points on the rim. Three

centigrade thermometers were also located in the box to check with the potentiometer. The diameter of bore of the runner before heating was 20.005 inches—after heating, 20.015 inches, an increase of .010 inch.

The shaft was now suspended vertically by the crane and lowered into place. The coupling was next wrapped and boxed for heating. Nine turns, about 150 ft. of the same cable, were drapped around the rim and nine turns, about 50 ft., around the hub, so arranged that either or both windings could be connected as desired. The coupling was suspended so that when heated it could be lowered in place on the end of the shaft.

It was first thought to bring up temperature with rim

winding, using hub winding for final heat. The hub temperature increased more rapidly than the rim. The current was started at 9:15 a.m. at 18 volts, 75 amperes, and increased to 25 volts, 205 amp. by 11:30 and continued with slight variations until 7:30 in the evening when it was recorded as 45 volts, 250 amperes. The foreman in charge of the work is of the opinion that considerably less time might have been consumed in attaining the desired temperature without danger of harm to the coupling by using higher temperatures from the beginning.

The diameter of bore of the coupling, cold, was 11.746 inches, after heating 11.759 inches, an increase of 0.13 inches. The completed job was satisfactory in all particulars.

Problems in the Steam Generation of Power in the West

Practical Suggestions as to Types of Apparatus and Methods of Operation Which Have Proved Successful in Western Power Plant Practice are Outlined in the Convention Report of the Prime Movers Committee

R. C. POWELL, Chairman *

Steam Turbines.—A subject of special interest to the power companies in California is the use of large steam turbine generating sets as stand-by units to supplement their water power. Such units are operated at times connected to the system but carrying only a small load except upon failure of the transmission supply, when full load must be picked up in the shortest possible time—that is, as quickly as the oil-fired boilers can supply steam. The present practice of most companies is to operate units of 10,000 to 15,000-kw. capacity in this way, but probably units of 30,000 kw. and larger will operate just as satisfactorily under similar conditions, if the minimum load carried is such that the exhaust end is kept at normal temperature. This minimum load may be between 1000 and 3000 kw. for a 30,000-kw. unit. It is important, however, that the minimum load be such that the low pressure end of the machine is not unduly heated, as large machines have a tendency to heat up in low pressure stages if the load is too small, and cool off almost instantly when the load comes on suddenly. There will then be distortion and vibration. The point to be emphasized is that the ability to take the load suddenly is not a function of the size of the machine, but rather the proper ratio of minimum load to rated load. In operating large units under these conditions, the boiler room operation must be such as to insure that no water will be carried over the turbine.

Gas Turbines.—Some development work is being carried on in Europe, but none is apparently being done in this country.

The mercury turbine is receiving intensive study and the results obtained to date give promise of a prime mover having efficiencies equal to those of the Diesel engine. A mercury turbine and boiler are being manufactured for installation at Hartford, Conn.

The Diesel engine has found its most important field in marine propulsion. It is not a serious competitor to the steam turbine except in central stations of capacity less than 2000 hp. There have been twenty-seven Diesel engines, totaling 4740 hp. installed in California, not including marine installations.

Problems of Lubrication

No particular difficulties of lubrication have been experienced in modern steam plants except in the case of steam turbines. Most, if not all, users of steam turbines have experienced trouble with the oil in the lubricating system.

Sludging.—With continued use, the oil precipitates a sludge which causes trouble with pump valves, clogging of strainers, governor gear, etc. To avoid this as much as possible, oil should be chosen with a minimum percentage of unsaturated hydrocarbons, and the temperature of the oil should be kept low, preferably below 140° F. Air and water should, if possible, not be allowed to churn with the oil. Proper facilities should be provided to permit the impurities to settle out; also, some form of continuous purification should be installed.

Emulsification.—Different brands of oil differ greatly in their liability to emulsify. The Bureau of Standards Demulsification test may be employed to determine if any oil has proper demulsifying properties. It has been found in one case that the water which separates out from emulsified oil will form much more permanent emulsion with new oil than will either distilled water, 1 per cent sodium chloride solution or 1 per cent normal caustic soda solution, which are specified to be used by the Bureau of Standards in making the demulsification test. The reason for this has not been determined. The fact, however, points to the advisability of removing such water as settles out and preventing its reentrance into those portions of the system where emulsification is produced.

Foaming.—There does not appear to have been any noticeable amount of this trouble on the Pacific Coast.

Formation of Acid.—After protracted use, all oils will show an acid reaction. No definite relation seems to exist between the percentage of acidity and the amount of corrosion that will result. The acid may attack iron piping and form large quantities of a dark brown sludge which is practically pure iron oxide. No assurance is obtained that oil is in good condition because the acid content is small, but it is advisable to watch oil having more than a few tenths of one per cent.

Thickening.—Oils, especially when worked at high temperatures, suffer volatilization of their lighter constituents and in consequence their viscosity increases. This leads to greater frictional losses in the bearings, which in turn causes higher oil temperatures, aggravating the trouble. This condition is met by the addition of new oil. Increase of viscosity is a most valuable indication of the aging of the oil.

Purification.—Nothing short of again refining an old used oil will restore it to a condition equal to new. By means of filters, entrained and emulsified water and solid particles can be partly removed and the oil rendered better for service. Acids and soluble products of oxidation and polymerization

* Prime Movers Committee: R. C. Powell, chairman, J. W. Andree, H. G. Balkwill, C. F. Benham, G. H. Bragg, C. H. Delany, R. C. Denny, F. O. Dolson, O. Hilleary, L. M. Klauber, J. A. Koontz, R. S. Masson, R. F. Monges, D. D. Morgan, H. W. Marvin, E. A. Quinn, P. M. Robinson, C. E. Steinbeck, R. E. Thompson, A. J. Turner, E. E. Valk, M. V. Watson, R. J. C. Wood.

cannot be removed mechanically. The main requisite for oil filters is that they be large enough so that the flow through them is not too rapid to prevent their satisfactory performance.

Condensers and Cooling Towers

The majority of the power plants on the Pacific Coast are located either on tide water or in places where the available water supply is of poor quality requiring treatment. Therefore, surface condensers are used very largely, and the following discussion applies entirely to this type of unit.

Tubes.—Ordinary Muntz metal tubes are found to be unsatisfactory in salt or hard water. Best results have been obtained with tubes of Admiralty mixture. Operating records seem to indicate that it is questionable whether the tinning of tubes increases their life to any extent. Few of the power companies are using tinned tubes at the present time. The use of zinc plates in the water boxes to prevent tube corrosion seems to show some merit and is used by several of the power companies.

Undoubtedly there is a great variation in the quality of tubes on the market and the best product can only be procured by buying on rigid specification and inspection. The specification on which the Southern California Edison Company buy their condenser tubes is as follows:

"Material.—These tubes to be made of a composition of 70% copper, 29% zinc, 1% tin. In every case all the metal used must be of the purest commercial quality. No component to vary more than 1% above or below amounts specified and shall have a uniform texture and thorough amalgamation.

"Annealing.—All tubes after final drawing shall be annealed at such a temperature and for that length of time which shall relieve the tube of internal stresses, but shall leave a fine crystalline grain as shown by the microstructure of the finished tube. The photomicrograph 'A' accompanying and made a part of this specification shows what is considered as a fine grain under magnification of 50 diameters. Coarse grained tubes will not be acceptable and photomicrograph 'B' accompanying and made a part of this specification, shows what is considered a coarse grained tube under magnification of 50 diameters.

"Dimensions.—All tubes to be 17 feet, 2¼ inches long with an allowable variation of 1/32 inch and to be 1 inch outside diameter and with the thickness of the wall to be No. 16 Stubs gage on the thinnest side.

"Test Specimens.—Our inspector shall select at random from the finished tubes a representative number not exceeding 1% of the entire order and shall remove 1/16 in. from their ends for micrographic study and chemical analysis.

"Surface Inspection.—All tubes must be seamless, true to form, of substantially equal thickness throughout, free from cracks, seams, slivers, blisters or other defects.

"Rejection.—All tubes failing to pass surface inspection will be rejected. Should 20% of the tubes examined for microstructure show a coarse grain, then the whole shipment may be rejected, but if the manufacturer elects to have another 1% of the tubes examined microscopically, in addition to the 1% examined by the inspector, and less than 20% of the whole number examined show coarse grain, then the shipment will be accepted and the purchaser will pay for the examination of the second lot of 1%, but should more than 20% of the whole number examined show coarse grain, then the whole shipment will be rejected and the manufacturer shall pay the cost of examining the second lot of 1%."

Copper tubes have been tried but have usually been rejected. It appears that slight impurities in the copper have a tendency to set up an electrolytic action. The Los Angeles Gas and Electric Corporation have equipped some of their condensers recently with copper tubes with good results, although they have not been in a sufficient length of time to state definitely.

Tube Packing.—There seems to be a tendency to replace fibre and corset-lace packing with various forms of metallic packing. The San Joaquin Light and Power Corporation, especially, reports favorable results with metallic packing.

Cleaning.—Aside from the usual cleaning to get rid of mud, silt, leaves, shells, etc., the hard water used for cooling (especially in Southern California), forms a hard scale which is very troublesome. The worst cases of this are where cooling ponds or towers are used and the water temperatures are fairly high.

This scale must be removed either by wire brushes or, in some cases, actually bored out, which process is very expensive. Some companies have used hydrochloric acid. To avoid scale and expense of removing same, it has been found advisable to treat the make up circulating water and thus eliminate the formation of scale.

Air Leakage.—Comparatively little attempt is made on

the part of the Pacific Coast companies to measure the amount of air leakage into the condensers. This is a refinement which may be found worth while looking into.

Cooling Towers and Spray Ponds.—The decision as to use of a spray pond, natural draft, or forced draft cooling tower depends very much on local conditions, especially the amount of space available. The most interesting information available is in regard to the cooling towers of the Los Angeles Gas and Electric Corporation. Loss for these, due to evaporation, amounts to about 18 pounds of water per kilowatt hour delivered at the station switchboard. Cooling towers constructed of California redwood with brass trimmings and copper spikes seem to last quite indefinitely.

Boilers and Accessories

Oil Burners.—Oil burners used on the Pacific Coast are almost entirely atomizing. However, two large plants are now in process of construction which are designed for mechanical atomizers, and information will soon be available in regard to these.

The success of the mechanical atomizers in the East will undoubtedly lead to their use in new installations on the Pacific Coast, but as most of the plants on the Pacific Coast are equipped with steam atomizing burners without forced draft and with moderate heights of stacks, it would be an expensive matter to change over to mechanical atomizing burners. Mechanical atomizers appear to have their greatest advantage at high overloads, that is, above 200 per cent of rating. Since boilers on the Pacific Coast are not ordinarily operated above 200 per cent of rating, the gain in efficiency by changing the type of burners is questionable. If, however, greater capacity is required from a given installation, it may be advantageous to change to mechanical atomizers.

Of the steam atomizing burners in service the most popular seem to be the Hammel, the Leahy and the Peabody. These burners use one and one-half to three per cent of the steam generated by the boiler for atomizing. The cost of upkeep of the burners runs from 50c. to \$2.00 per month for each burner. Both Merritt and Moore automatic regulators have been used in several plants, with satisfactory results.

Boiler Capacity.—The maximum capacity generated by boilers in service to carry the full load on the plant when of rating except in a few cases where 250 per cent is obtained. At these capacities the quantity of oil burned per cubic foot of furnace volume amounts to from four to six pounds per hour and from one to three pounds per hour per square inch of air opening in to the furnace.

Stand-by Operation.—It is customary to keep enough boilers in service to carry the full load on the plant when operating as a stand-by station, thereby enabling the load to be picked up instantaneously. In some cases, however, only sufficient boilers are kept in service to handle the load actually carried by the plant, and in this case it is necessary to fire up extra boilers when the steam plant is called on to carry a greater load. The length of time required to fire up boilers ranges from 45 to 60 minutes, starting with a cold boiler, and from 15 to 20 minutes starting with a warm boiler.

In plants required to pick up the load instantaneously, the usual method of keeping the boilers hot is to fire them alternately, keeping as many boilers under fire as possible, with one burner in operation. In some cases it is customary to keep a fairly good fire under a smaller number of boilers and change over to other boilers more frequently, the theory being that better efficiency can be obtained with a reasonable size of fire under the boiler. The oil required to keep boilers warm for stand-by service amounts to from .4 to 1 barrel of oil for each boiler.

Measuring Instruments.—Measuring instruments are used quite extensively in the boiler plants on the Pacific

Coast. The particular instruments used are Bailey boiler meters, recording thermometers, Venturi meters, draft gages, recording pressure gages, CO₂ recorders and oil meters.

The oil burned for the entire plant is invariably measured by a gage on the oil tank. Oil meters are not very reliable. Atomizing steam is measured in several plants by means of flow meters, and this is of great assistance in enabling the men to reduce the quantity of steam used.

Soot Blowers.—Soot blowers are used quite extensively in oil burning boilers and are generally considered to be of value in increasing the efficiency of the boilers and reducing the labor required to keep the boilers clean. In some cases soot blowers have effected a drop in flue gas temperature of as much as 100°.

If soot blowers were used every day it is possible to blow away more steam than is saved by cleaning the boilers, so that care must be used in reducing as much as possible the length of time that the soot blower valves are open. In the case of high pressure boilers it is desirable to reduce the pressure of the steam to the soot blowers so as to avoid excessive use of steam. A trouble experienced with one type of soot blower has been the shifting of the stops so that the soot blower blows the steam in the wrong direction, sometimes against the baffles of the boiler, causing these to be displaced. This has been corrected by the new valve-in-head blower recently placed on the market.

Economizers.—Economizers are not very popular in power plants on the Pacific Coast in oil burning plants. The temperature and volume of flue gases are less with oil burning boilers than with coal burning boilers. In one plant economizers are used where all the auxiliaries are electrically driven, so that there is no exhaust steam available for heating the feed water.

These economizers take water at an initial temperature of about 100° and absorb about seven and one-half per cent of the heat in the fuel. The annual cost of upkeep, including fixed charges on the investment, repairs, cleaning and attendance, amounts to about \$2.00 per year per rated boiler hp. The economizer heating surface is 60 per cent of that for the boilers. With the boilers operating at 155 per cent of rating for about 55 per cent of the time, the fuel saving due to economizers balances the yearly operating cost of oil at 54c.

Natural Gas.—Natural gas is used as fuel in certain sections of the Pacific Coast, and the following information regarding a plant burning natural gas will be of interest:

The gas which is brought to the plant at 250 pounds pressure is reduced before reaching the burner to between 3 and 7 ounces. The boilers, which are 822 hp. Stirling, operating satisfactorily up to 200% of rating, give higher efficiency and require less attention than those burning oil. Gas is measured to the individual boilers by orifice meters. Although considered unnecessary for gas, soot blowers are installed to be used when oil is burned. The boiler efficiency runs from 75 to 85%, and 22 to 30 cu. ft. of gas of 950 to 1050 B.t.u. per cu. ft. are burned per kw-hr. At 15c. per thousand this gas is equivalent to oil at 90c. per barrel.

Fuel Oil.—The oils available as fuel for steaming purposes are the residuums obtained from refineries after the distillation of gasoline, kerosene and other lighter products. The committee feels that it is inadvisable to surround the purchase of fuel oil with too rigid specifications, as a residuum that must be delicately refined ceases to be a residuum in its true meaning. Those who desire to purchase fuel oil under specifications are referred to the Report of the Committee of Standardization of Petroleum Specifications of the United States Bureau of Mines, Bulletin No. 5.

Power Station Auxiliaries

From a collection of data on Pacific Coast practice relating to power station auxiliaries, the following has been prepared:

Floor Space.—The floor space required by electric motor drive and steam turbine drive, is about the same, but that required for the engine-driven units is about 30% greater.

First Cost.—The first cost of the steam drive is about 40% higher than for the electric motor.

Operating Efficiency.—The actual thermal efficiency of the complete unit, when exhaust steam is used for heating feed water, is apt to be much better for the steam drive.

Interruptions Due to Repairs.—The average annual number of hours out of operation, due to repairs for the reciprocating engine, is about twice that for the electric motor. The steam turbine is slightly less than either, but none of the turbines has been in long enough to state definitely. Motor repairs are much cheaper and quicker to effect than turbine repairs; motors and motor repair parts are obtainable from Pacific Coast stocks, which is not the case for turbine parts.

Supplies.—The annual cost of supplies, such as lubricating oil, packing, etc., is about equal for electric motor and steam turbine, but is about four times as high for the reciprocating engine.

Repairs.—The annual cost of repairs for the steam turbine is about 50% higher, and for the steam engine, about two and one-half times as high as for the electric motor. The advisability of installation of electric motor drive, or steam drive, is very largely a question of economical method of heating the boiler feed water. If house turbines or economizers are available for heating feed water, the electric motor drive will probably be preferable in almost all cases. Steam turbine drive for circulating pumps on a unit which may be called upon to operate for long periods, at a small fraction of its rated load, may become a very different piece of apparatus, on account of excess exhaust steam above requirements for heating boiler feed water. The practice of installing duplicate units, one steam drive and one motor drive, is recommended.

Heat Balance Sets.—There are no heat balance sets in operation on the Pacific Coast; hence no data on this subject are available. This is, however, an important subject, and favorable reports have been received from eastern installations.

Direct Acting vs. Centrifugal Boiler Feed Pumps.—The hours out of service for repairs, annual cost for supplies and repairs, and floor space, for the direct acting pump, is considerably higher than for the centrifugal pump.

Other items of comparison in favor of centrifugal boiler feed pumps are steady pressure, uniform flow of water, and no danger of excessive pressure, even with discharge closed. The high speed of the centrifugal pump makes it adaptable for direct connection to either steam turbines or electric motors. The principal advantage of the direct acting pump is the simplicity of operation and ease of regulation.

Small Turbines for Auxiliary Drive.—The small steam turbine is well adapted for auxiliary drive where space is limited and high speed can be utilized, such as for exciters and high speed pumps. The steam consumption of small turbines is much higher than that of other methods of drive, but this is not serious, provided all of the exhaust steam is used for feed water heating.

Considerable trouble has been experienced, due to dropping off in economy and capacity of small turbines, on account of wear of blading and nozzles. Trouble has also developed with governors furnished with these turbines, in cases where the turbine is required to operate on the governor.

High Pressure Steam Piping.—The replies to a questionnaire sent out by this committee show the plants of member companies to operate at the following gage pressures: 160, 175, 200, 225, 250 and 260. The majority of the plants operate at 200 pounds gage. These, however, are old plants, new installations being designed to operate at 225 pounds or more, with superheat ranging from 100° to 250° F.

For all high pressure work for the larger sizes, the practice on the Pacific Coast seems to be to use valves with cast steel bodies, Monel seats, seat faces and stems. Various types of jacking give good satisfaction. No electrically operated valves are in operation on the Coast.

Boiler Automatic Stop Valves.—Some trouble has been experienced with these valves. One company reports the indicator stuffing box packing would not hold. This trouble was overcome by removing the indicator. Other companies report trouble due to sticking, which was overcome by re-grinding the rings of the valves or removing them entirely. The trouble seems to be more pronounced with superheated steam.

Various makes of pump governors are used with satisfactory results. Valves sometimes stick and cut but Monel metal parts improve the operation. Cast steel fittings are used for all high pressure work—two and one-half to three inches and over. Below this size malleable iron fittings are used. Some companies make a practice of the use of welded nozzles on their headers when they can be used, but it does not seem to be general practice.

Turbine Automatic Stop Valves.—One company is installing a number of butterfly quick closing valves which are electrically tripped, and automatically close upon any electrical failure which automatically cuts the generator off the bus.

Fuel Oil Piping.—Most of the companies run oil headers on top or on the front of the boilers. One company had a fire caused by failure of a cast iron flange on an overhead line. A large quantity of oil was released, and quickly flowing down to the fires, become ignited. The company is now

putting oil piping in trenches. Pipe covering is for the most part 85 per cent magnesia.

Draft Gages.—Draft gages are used generally, although one company has neither draft gages nor flow meters.

Steam Flow Meters.—The usual Pacific Coast practice is to equip all boilers with flow meters. Flow meters with nozzle plugs have given trouble in practically all cases, but this has been corrected by changing the plugs to flow nozzles or orifices.

Feed Water Measurement.—Feed water measurement is obtained by metering feed water heaters, V-notch meters, weighers, orifice and Venturi meters.

Turbine Condensate Measurement Instruments.—One company uses a Venturi meter, which can be switched from one turbine to another for metering the condensate. Temperatures are taken hourly. This same company has a recording orifice meter on one of the new installations. Leakage is determined electrically. Another company takes hourly temperature readings, and measures condensate by means of water meters. Another company uses recording thermometers to secure temperature. Weighing tanks, which can be switched from one turbine to another, are used for condensate measurement. The general opinion is that electrical methods are the best for determining water leakage.

Boiler Furnace Economy Instruments.—Several plants report the use of CO₂ recorders, checked occasionally by hand instruments. These recorders are generally so arranged that one instrument may be switched from one boiler to another. Boiler meters, recording simultaneously steam and air flow, are found to give satisfactory service in determining furnace efficiency. The temperature recording elements of these meters, however, are easily put out of order. Recording thermometers, while giving very little trouble themselves, are subject to frequent breakage. Mercury thermometers and hand orsats are used to check all recording instruments.

Boiler Water Concentration.—Practically all companies rely on the silver nitrate test for boiler water concentration determination. Electrical instruments, checked by the above analysis, are frequently used. One hundred grains of salt per gallon is ordinarily found to be heavy enough to allow

concentration, but one company reports operating up to 300 grains.

Fuel Oil Measurement.—No satisfactory meter has yet been found for fuel oil measurement.

Feed Water Treatment

The purification of boiler feed water has been before the operating engineer for a number of years.

Trouble with feed water is caused by suspended matter which may be removed by filtration, and dissolved scale forming minerals, which may be removed by chemical treatment of the water. This treatment may be done either in the boiler or preferably before putting the water into the boiler. Treating the water before it reaches the boiler has the advantage that it requires less blowing down of the boilers, thereby saving heat. The means in use for this purpose are chemical softeners, the so-called "Zeolite" process, and evaporators. Both hot and cold types of chemical softeners are in use. Heating the water in an open feed water heater will materially improve water possessing temporary hardness (carbonates).

There is some question as to the advisability of using "Zeolite" softeners for water having very much temporary hardness, since the calcium and magnesium carbonates are changed to soda ash, which, being soluble, goes into the boiler. Distilling boiler feed water by means of an evaporator has been very successful aboard ship, and is now being used in stationary power plants burning coal. Evaporators are not practicable for oil burning plants using steam atomization, on account of the loss of steam up the stack.

Operating Code.—Very few of the Pacific Coast companies have done anything in the matter of complete operating rules and regulations. One company has in force a code covering such subjects as routine cleaning and overhauling, operating rules and regulations, switchboard instructions, boiler room operation, safety rules, etc. Very much useful work on this subject can be done by all companies, and will be of greatest value in improving operating efficiency and reducing accidents.

This subject is recommended especially for study by the succeeding committee.

Western Hydroelectric Development Meets Special Problems

Western Practice in Meeting the Special Conditions of Water Power Development on this Coast Analyzed in the Comprehensive Report of the Hydraulic Power Committee of the Pacific Coast Electrical Association

F. O. DOLSON, Chairman *

During 1921 the work of the Hydraulic Power Committee was divided between nine sub-committees each of which have rendered separate reports on the subjects they were investigating. In all instances these reports are very full and contain much of interest to western power companies. Four of these reports have been submitted to the National Hydraulic Power Committee of the N. E. L. A. and will be published by that committee as part of its annual report. Due to space limitations and to avoid duplication of expense, these sub-committee reports will not be reprinted here, but are abstracted in the following report.

Artificial Waterways

A large volume of detailed data on the physical charac-

teristics of most of the more important hydroelectric projects in the West is included in the report of the sub-committee on artificial waterways under the chairmanship of R. C. Starr of the San Joaquin Light and Power Corporation. The report includes data on 34 tunnels, 40 canals, 37 flumes and 53 penstocks. Capacities up to 2100 cu. ft. per sec. and pressure up to 925 lb. per sq. in. are included in the tables. Such data as sizes of tunnels and penstocks, grades, designs, construction methods, and coefficient "N" are shown in the tables, and the discussion included points out the progress made and the reasons for the use of the more modern designs and methods employed. Actual tests under operating conditions are given where available. This report is not to be printed by the national committee on hydraulic power of the N. E. L. A.

Surge Tanks

Where long closed conduits are employed in connection with turbines it becomes necessary to provide surge tanks so that the water flowing to the turbines can be quickly in-

* Hydraulic Power Committee: F. O. Dolson, chairman, H. A. Barre, C. E. Blee, G. H. Bragg, E. M. Breed, E. F. Crawford, P. O. Crawford, H. L. Doolittle, P. M. Downing, J. Eastwood, F. R. George, B. F. Jacobsen, J. P. Jollyman, L. Jorgensen, J. A. Koontz, R. G. Manifold, A. H. Markwart, R. S. Masson, M. C. McKay, Don Morgan, T. A. Panter, H. R. Peckham, A. B. Pierce, C. O. Poole, A. J. Robertson, R. C. Starr, I. C. Steele, P. M. Wentworth, J. E. Woodbridge, E. A. Quinn.

creased or decreased as the case may be. These conditions are met by surge tanks which are positive in their action and beneficial to both increases and decreases of plant load. Such surge tanks are designed to permit rapid increase in the load upon the station without separation of the water columns; to prevent spilling of water upon the rejection of load; and to relieve water hammer in the penstocks, according to the report of the sub-committee on this subject, under the chairmanship of E. A. Quinn of the San Joaquin Light and Power Corporation. The report also includes the design and operation and test data on the surge tanks of the Kerckhoff plant of the San Joaquin Light and Power Corporation. The natural conditions for constructing a surge chamber at low cost at this plant are pointed out and the unique design and test data make a very valuable paper on this subject. The report is to be printed by the national hydraulic power committee.

Automatic and Semi-automatic Generating Stations

At the present time there are five small hydroelectric plants in the West which are operating with some automatic and semi-automatic features. In addition, other stations are being reconstructed for semi-automatic operation by the Southern California Edison Company. Complete description of one of the stations of the Southern California Edison Company is given in *Electrical World*, July 30, 1921, and of two of the San Joaquin Light and Power Corporation's automatic stations in *Electrical World*, December 27, 1919.

The Drop plant of the Pacific Light and Power Company at Naches, Washington, is described as being a 1900-hp. semi-automatic station, which requires an attendant to put the plant on the line and adjust the water. No governor is provided and the plant carries a block load until something happens on the system when the station is separated from the system by the operation of overload or no-voltage release relays. After such separation the station runs at over-speed until the operator comes in and puts the machine back on the line. This unit has been operating since 1914 with only two cases of trouble, both due to bearings. No provision is made against overheating of bearings.

The Mill Creek No. 1 plant of the Southern California Edison Company contains three 250-kilowatt generators which are operated under the care of a watchman. A unique automatic water control operated by a float is described in connection with this plant. Governors are used and regulation is by hand.

Spalding No. 2 plant of the Pacific Gas and Electric Company contains a 1,000-kilowatt generator, and it is designed for remote manual control with full automatic protection in case of line trouble, winding failures, hot bearings, etc. Synchronizing and loading is handled by remote control from Spalding No. 1 station. A unique substitute for governor control by the installation of motor operated coil springs is described in the paper. This report is not to be printed by the national hydraulic power committee.

Penstock Valves, Relief Valves and Bursting Plates

In compiling this report no attempt has been made to cover the subject of governor operated valves. The investigation has been confined solely to penstock valves of various types, bursting plates and relief valves of an automatic nature. An effort has been made to cover three phases of the subject, namely, manufacturer's statements covering the more recent developments that have been made in this equipment; experiences from operating companies outlining the general nature of troubles that have been experienced in the operation of such equipment; and a list of the more important installations of penstock valves of various types. A new type of bursting plate is also described and illustrated in the report, which has been rendered under the chairmanship of H. L. Doolittle of the Southern California Edison

Company. The report concludes that bursting plates are not as a rule satisfactory and that the use of the same is decreasing. The report also shows a decided leaning toward the use of Johnson type valves where the expense is justified and points out the hazard due to not being sure of ability of valves of other types to close in emergencies. The report is a very valuable addition to the subject and is to be printed by the national hydraulic power committee.

Station Auxiliaries

The report of this sub-committee, under the chairmanship of M. C. McKay of the Pacific Gas and Electric Company, describes the auxiliaries used in fifteen hydroelectric stations of the West with statements relative to the actual operating conditions and experiences of the men in charge of the plants. It also includes miscellaneous notes on auxiliary equipment for such stations with recommendations for future installations. It favors gear pumps for oil, points out the necessity for providing means of maintaining air pressure and oil levels in governor systems, warns against the use of too light oil, describes trip coils for governors and relay protection for generators and transformers, etc. This report will not be printed by the national hydraulic power committee.

Station Instruments and Operating Records of High Head Plants

To collect data for this report questionnaires were sent to the various companies in the West, nineteen of which replied. Of these only six indicate that the companies reporting have taken definite action toward improving the economy of their hydroelectric stations and providing a continual check upon the same. Six others indicate a decided interest in the matter of economy and have installed various devices for checking same. The other seven rely entirely on inspections of the water wheels for signs of decreasing efficiency. Apparently small importance is attached to the use of recording pressure gages and changes in pressure are not taken into consideration in checking water economy. In general the report which was rendered by the chairman, F. O. Dolson of the Southern Sierras Power Company, points out that Venturi meters for pipe line measurements are preferred. The most important point brought out by the report is that the companies who have already accomplished most along these lines realize the immense value of this work and are taking steps to add to their measuring abilities and improve their operating methods.

The report concludes that both the operators and the dispatchers should at all times be advised of the operating efficiency of each plant and that they personally should be required to check the results against previous results under like conditions and against results obtained by other operators. It is surprising how the economy can be improved by continually showing comparisons and establishing a spirit of rivalry among the operators and dispatchers on each shift. To obtain this result, however, it is of course necessary for the companies to provide proper measuring devices and the operating superintendents must provide and follow up a suitable system of records and comparisons. This report will be printed by the national hydraulic power committee.

Operation and Governing of Inter-connected Plants

The principles underlying the proper governing of inter-connected systems, according to R. J. C. Wood of the Southern California Edison Company, chairman of this sub-committee, are the same as those applying to inter-connected plants whether all are hydroelectric or are a combination of hydroelectric and steam. Certain of the plants will operate on swinging and varying loads with less vibration in all day efficiency than others. This may be due either to the inherent efficiency curve of the plant at different loads or to the possibility of storing water not used. Other plants will have poor

efficiency at partial loads, or due to lack of storage will waste water when not used. The report describes the method used in operating plants of the Southern California Edison Company's system and other systems inter-connected with this. Load curves both daily and annual are included and described in the report. The important points brought out are that all stations must be placed under the jurisdiction of one dispatcher, the governing must be done by one large plant or unit, the stream flow plant kept on block load and all plants operated at their most economical loads. The report also recommends that in the cases of interconnected systems the dispatchers should become personally acquainted with each other in order to increase the general operating economy. This report will be printed by the national hydraulic power committee.

Maintenance of Hydraulic Work

The report of this committee, under the chairmanship of P. O. Crawford of the California Oregon Power Company, is submitted entirely in the form of tables covering four subjects: Wood pipe lines, steel pipe lines, flumes and concrete structures, and a table showing the plant outages due to the time required to maintain these. An analysis of the table on wood pipe indicates that in general it is long lived and gives little trouble. There is some difference of opinion as to whether it should be buried or covered and apparently in some soils covering causes decay. The table on steel pipe shows long life, satisfactory service and small maintenance expense. It also shows that asphaltum paint is used most frequently and that very few cases of repainting are necessary. The report points out that practically all penstocks are buried except that of the Big Creek No. 8 station of the Southern

California Edison Company. The table on flumes shows good results but the maintenance expenses are apparently higher than on pipe lines.

The table on the deterioration of concrete shows that conditions are generally good and in those cases where deterioration has taken place, the cause is usually apparent and due to poor original work.

The table of plant outage for maintenance is very instructive. It shows first the outage due to head work maintenance is practically nothing. It shows second that on the Southern Sierras Power Company system where only one short flume is used, the total plant outage is only nine hours in the year. In general the major portion of plant outages are caused by repairs on the flumes. This report is not to be printed by the national hydraulic power committee.

Maintenance of Generating Station Equipment

The report of this sub-committee, under the chairmanship of B. D. Morgan of the Southern California Edison Company, points out that facilities for checking hydroelectric plant efficiency and the maintenance of same has not been adequately provided in the past, but that this subject is now receiving more attention, particularly in the original installation of sand boxes and the providing of a bench mark system for checking the water wheel efficiencies. Attention is called to the necessity of properly painting water wheel parts while they are dry and inspection of water wheels and governors is described.

The report also includes statements from the San Joaquin Light and Power Corporation and the California Oregon Power Company in which the above points are covered and the care of generators, disconnecting and oil switches, etc., are described.

Relay Protection for Electrical Apparatus in Western Use

Discussion of Special Problems of Western Irrigation Pumping Installations, Latest Schemes of Relay Connections, Recent Developments in Relays and Operating Experience with Existing Relay Systems.

G. H. BRAGG, Chairman *

Time-relay No-voltage Release.—A large percentage of the interruptions to the service to certain consumers can be eliminated if the manufacturers would furnish a no-voltage release having a hesitating rather than an instantaneous characteristic.

In California alone there are thousands of consumers, especially in the rural territory, who operate induction motors unattended. To this class, it is not only annoying but it costs them time and money to leave their work or else send someone to restart after each momentary voltage dip.

It was suggested that the desired results might be accomplished by means of a dash pot applied to the existing forms of releases. Another suggestion proposed the installation of a centrifugal switch on the shaft of the motor which would open only when the speed is reduced to a predetermined value and thus automatically disconnect the motor from the source of power. The problem is not so much a mechanical or electrical one as it is a financial one, for the device, to be acceptable to the majority of the consumers, must be low in first cost. The matter was finally disposed of by the following resolutions:

The Apparatus Committee of the Pacific Coast Geographical Division recommends that manufacturers of electrical equipment contrive and place upon the market a time-relay switch release having such characteristics that the

operation of induction motors will not be interrupted on account of momentary voltage dips. It is further recommended that the National Committee pass a similar resolution and forward a copy to all member manufacturing companies.

Accidental damage to deep well turbine pumps has been studied with a view to bringing forth expressions of opinion as to the best methods of prevention. This particular type of pump must be driven in but one direction; if it should be reversed the shaft couplings will unscrew and so permanently put the pump out of commission.

On more than one occasion, a temporary power interruption has unexpectedly shut down the operations of deep well turbine pumps. Invariably, the water column above the runners reverses the rotation until the water level equalizes. Trouble occurs if the electric service resumes with potential on only one phase, for then the motor will speed up in the reversed direction of rotation, causing damage as above explained.

Ordinary overload protection by either fuses or circuit breakers does not, except in unusual circumstances, take care of this difficulty; certain forms of reverse phase relays will amply protect, but not all of them are positive. Low voltage releases are now customarily installed on such installations; such low voltage releases, preferably with time-relay feature suggested above, and arranged to operate on failure of any one phase, would seem to be a satisfactory solution of the problem.

*Relay Subcommittee: G. H. Bragg, Chairman, L. J. Moore, A. W. Copley, E. R. Stauffacher, W. C. Smith.

Some pump manufacturers are now equipping their pumps with a ratchet mechanism in the couplings between motor and pump, thereby insuring safety to the pump in case of a reversal of the rotation of the motor.

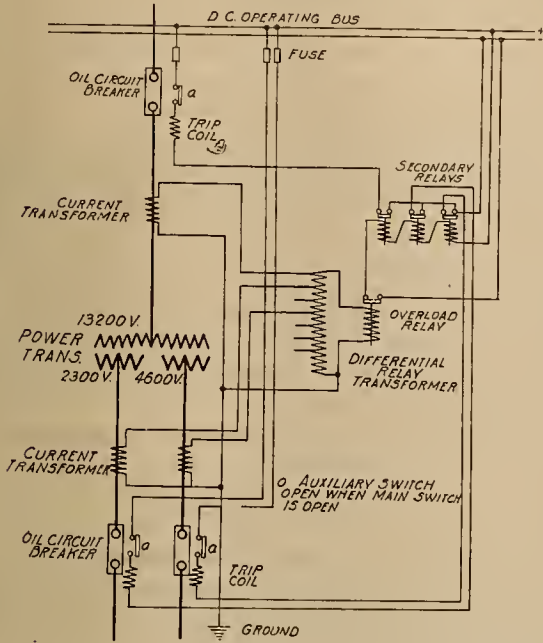


Fig. 1.—Diagram of connections for automatic protection of 3-winding transformers.

Protection of Three Winding Auto Transformers.—One company has a number of 5,000-kva. single-phase auto transformers, whose ratio is 63,510/110,000 volts Y to

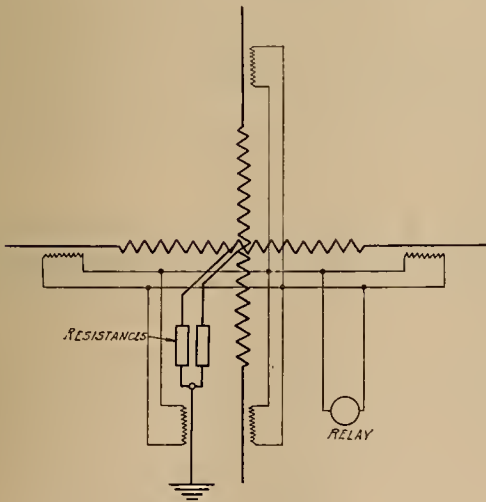


Fig. 2.—Suggested system of differential relay protection for 2-phase generators.

40,100/69,500 volts Y. There is also on the same core a second winding having a capacity of 1,650 kva. at 6,600/11,500 volts Y and also a tertiary winding wound for a potential of 6,600 volts. For the protection of this combination a differential connection has been adopted for the auto transformer, with such an adjustment that it requires an unbalance in excess of 1,650 kva. per phase to operate the relays.

The 11-kv. star winding is protected by ordinary I. T. L. relays with a time setting somewhat faster than those in the differential connections.

The tertiary winding has a current transformer connected on the circuit for the purpose of indicating the current values circulating in the delta. After adjustments were finally made, there has been but one case of trouble and the operation was perfect.

Three Winding Transformers.—For the protection of three winding transformers, one manufacturer proposes the arrangement shown on Figure 1. To further explain the diagram it will be noted that the ratio of the current trans-

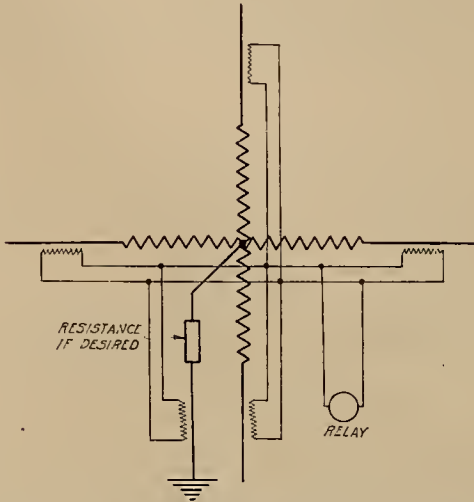


Fig. 3.—Suggested system of differential relay protection for 2-phase generators

formers and the ratio of the taps on the differential relay transformer are chosen without reference to the kva. capacity of the several windings, but with entire regard to the ratio of currents and voltages obtaining. No matter how the load may be distributed between the three windings, a correct balance is obtained on the differential relay transformer.

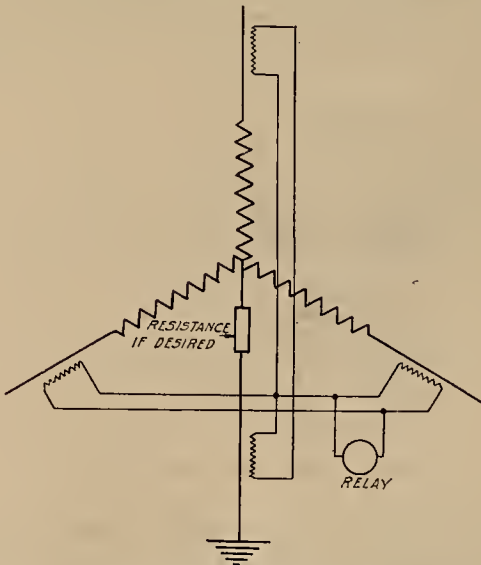


Fig. 4.—Suggested system of differential relay protection for three-phase generators

It must be noted that when bushing type current transformers are used, the usual difficulties experienced with differential connections involving parallel current transformers will result. That is, the residual current will divide between the relay and the other current transformers in inverse pro-

portion to their impedances, and since the impedances of bushing type transformers are rather low, the relay will not be as sensitive as might be expected.

Obviously, this scheme might also be used on transformers having but two windings. The introduction of the differential relay transformer permits the use of standard ratio current transformers for any ratio of the power transformers.

Protection of Frequency Changers.—For protection of 50/60 cycle frequency changers, current transformers have been connected in each phase of each set of a unit which actuates two reverse power relays, the tripping contacts of each being closed when its set is motoring and open when

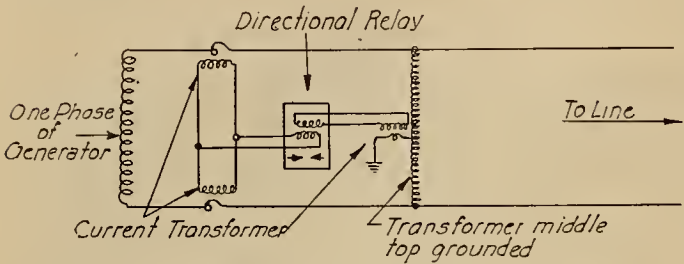


Fig. 5.—One phase of generator duplicate for second phase.

generating. The contacts of the relays on one side are connected in series with the corresponding relays on the other side so that, irrespective of the direction of energy supply, one contact of each pair of relays remains open under normal conditions. In case of internal failure of either winding of the frequency changer, current will flow toward the trouble from each system, closing both relay contacts simultaneously, which of course opens the switches, etc., in the usual manner and disconnects the frequency changer from the lines.

Protection of Two-phase Four-wire Generators.—This problem has been worked out recently by two different methods. Figures 2 and 3 show diagrams of one of them. This scheme requires five current transformers, one in each terminal of each phase and one in the neutral. The terminal currents are balanced against each other in the usual manner.

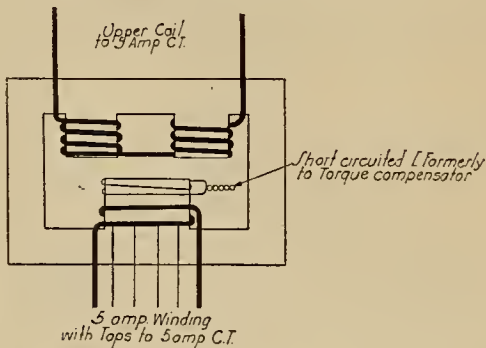


Fig. 6—Diagram of Directional Westinghouse Co. relay

To this interconnection is also connected the secondary of the neutral current transformer. The relay is finally connected, in shunt with the secondaries of all five current transformers.

In Figure 2 each neutral point of each phase is grounded through a resistance and has the advantage that a failure in one phase will not disturb the other.

In Figure 3 the neutrals are connected solidly together and then grounded through a resistance.

The same general plan is applicable to a 3-phase gen-

erator as shown in Figure 4 and it is obvious that it might be used to protect a generator with any number of phases.

The comments relative to the operation of bushing type current transformers, made above in connection with protection of three winding transformers, apply here, where for two phase, five transformers, and for three phase, four transformers, will be connected in parallel with the relay. However, bushing type transformers for generator protection have such a high ampere turn characteristic that the difficulty will probably be somewhat reduced.

The other method mentioned above is shown on Figure 5. For this scheme an ordinary induction current type relay is reconnected internally as shown in Figure 6. The torque compensator is first removed in order to reduce the volt ampere load. The upper coils of the relay are then connected in shunt with the secondaries of the two line current transformers which constitute one circuit. The lower coil is connected to the secondary of a current transformer connected in the ground connection of the middle point of an impedance across the two terminal leads.

From laboratory tests it was demonstrated that this relay would function properly for grounds in the generator winding but would remain open for grounds outside. So far as known, it has not been adopted in practice.

In splitting the windings of the induction type relay, care must be taken to obtain the proper phase relations between the two sets of fluxes that cause the disc rotation. The same scheme can be adapted to the protection of a three phase generator.

Protection of Tertiary Transformer Winding.—Recently there has been put in operation a large number of banks of transformers designed for 3-phase star connections and equipped with fractional capacity tertiary winding which provides a delta for circulating the triple harmonic currents.

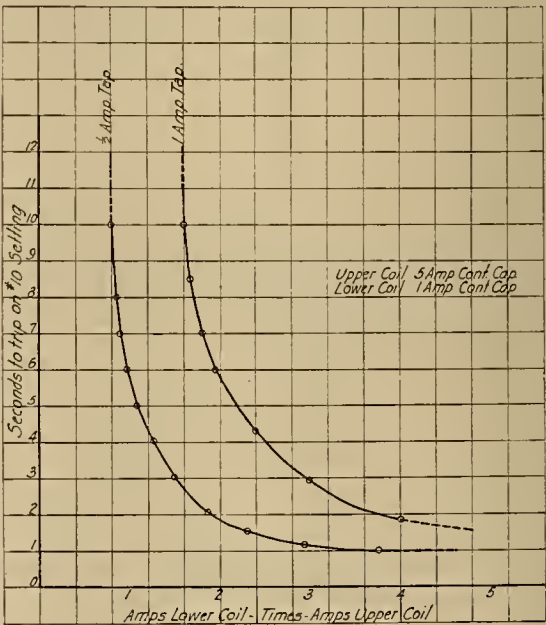


Fig. 7.—C. O. relay 1/2 to 1 1/2 ampere connected directional

The problem of protecting this tertiary without interfering with the power service from the star-star winding is as yet unsolved, although tentatively it has been suggested that this might be done by means of a temperature relay in contact with the hottest part of the winding.

This matter might well be discussed at the annual meeting by all members.

Recent New Developments in Relays

For disconnecting transmission lines automatically, it has been found that the residual current relay in combination with reverse power relays gives very satisfactory protection. In the ordinary C. R. relay the contacts on the watt element are in series with those of the current element and both must be closed simultaneously to complete the tripping circuit on the oil switch.

The connection between the two sets of contacts is made inside the case and so, in order to connect the contacts of the residual current relay in the multiple with those of the current element of the C. R. relay, an extra stud has been added to those usually supplied, it being connected to the conductor between the two sets of contacts.

In addition to the reversal of power which closes one set of contacts, it requires the closing of another set of contacts on either the overload or residual current elements to trip the breaker.

It should be understood that, under certain conditions, when the line current in the normal direction is quite heavy, a ground can occur which will operate the residual current

frequently as to provide no material objection to the use of this scheme.

Current Directional Relay.—Referring again to Figure 6, it will be seen that an ordinary induction relay may be made current directional by separating the upper and lower windings and connecting them to independent current coils. This connection has not been thoroughly tested out in practice as yet (March 1922) but from laboratory tests it was demonstrated that the relay would function as above outlined simply by changing the direction of current flow in one of the windings. The speed of closure increases with the product of the currents in the two windings as shown in Figure 7. It is quite likely that this scheme will have been tried out and a further report made at the annual convention.

Induction Type Relays With Torque Compensators Removed.—In using the ordinary induction type relay for operation of residual currents, it was found advisable to remove the torque compensator. By so doing, the minimum current to trip was reduced 50% and the volt ampere load 66%, as shown by curves (Figure 8) in the case of the 5 amp. relay, and 50% and 75% respectively as per Figure 8-A for the 1-amp. relay.

The simple alteration materially improved the operation of this relay when energized by residual currents, particularly from bushing type current transformers.

It should be mentioned that when the torque compensator is removed from such relays the selective action is very largely lost where very heavy currents can occur.

Operating Experience With Existing Relay Systems

The following table gives a summary of all the relay operations on the Southern California Edison System for the month of December 1921, a period of unusually severe storms:

	Number	Per cent
Total Operations of Relay.....	727	100
Correct " " "	289	39.8
Incorrect " " "	107	14.7
Uncertain " " "	331	45.5

The above includes all kinds of relays on all lines from 2,200 to 15,000 volts. The large percentage of incorrect operations is due to the use of series type relays which are now obsolete.

The stress incident to storm conditions prevented the reporting of accurate data in many cases, hence the rather large percentage of uncertain operations.

Relay Fails to Protect Transformer Bank With Tertiary.—A bank of 1,000-kva. transformers was connected star-star 54,000 to 11,000 volts with a 20% capacity, 20% impedance tertiary winding connected in delta for 2,300 volts.

When placed in operation, the neutral of the high tension winding was insulated, stability being maintained by the tertiary.

To protect the bank in case of overload, a current transformer was connected in the tertiary delta and its secondary connected to an induction type overload relay. The contacts of the relay were connected to the tripping coil of the oil switch, through which the bank was connected to the transmission lines.

Shortly after being placed in operation a short circuit occurred on the 11-kv. bus in the station which failed to close the relay contacts and caused the complete loss of the transformers. This scheme of protection was conceived to protect the tertiary and the bank in case of the grounding of a single wire of the transmission line, it being thought that destructive currents would circulate in the tertiary winding. This failure clearly shows that balanced three phase short circuits do occur and hence the scheme is defective. Since this occurrence, it has been suggested that the tertiary be protected by an oil switch which would open the delta connection, and no doubt during the coming year the practicability of this will be demonstrated.

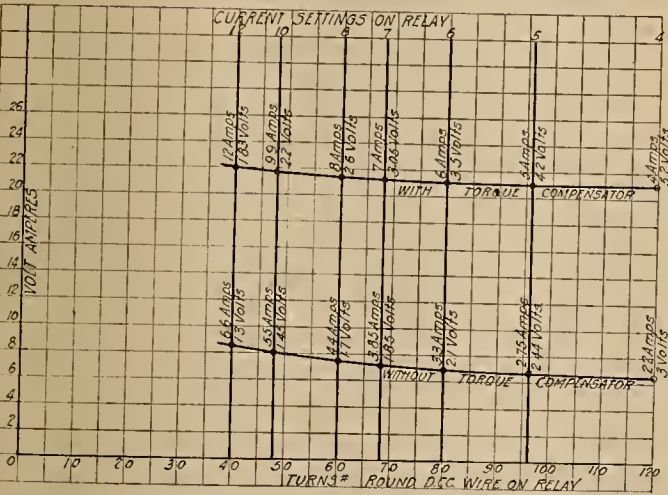


Fig. 8.—Data characteristics of 5 ampere C. O. relay—minimum current to trip

relay but not sufficient to cause reversal in any one of the reverse power relays, so that tripping would not occur. This difficulty has actually been met with in practice, but so in-

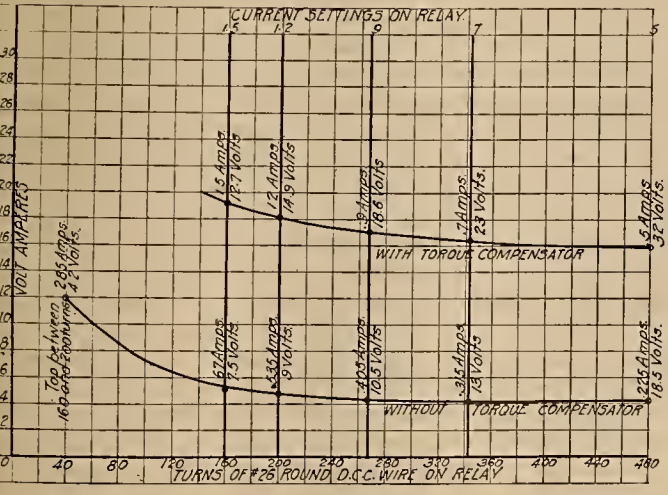


Fig. 9.—Data and characteristics of 1 ampere C. O. relay No. 256424. Minimum current to trip in 25 seconds on 10 time setting.

Can Wireless Be of Practical Service to Western Business?

Western Lumber and Mining Industry, as well as Others with Remotely Located Plants Will Find Much of Interest in the Experience of Power Companies as Reported by the Sub-Committee on Radio Communication

R. C. DENNY, Chairman

How far radio can grow out of the stage of a popular parlor toy and take its place as a serious factor in business service, is a question which has attracted much interest of late. It is obvious that there are wonderful possibilities latent in this field in the West where such industries as lumbering, mining, stock raising, and fishing often carry on the greater part of their activities in remote regions not reached by the ordinary modes of communication. The power companies, with their mountain plants and distant construction projects, have already experimented with wireless with some success, and their experience will be of interest and value to those contemplating similar installations.

Report of Sub-committee on Radio Communication, Pacific Coast Geographic Division of N. E. L. A.

Among the power companies of this district, it has developed that there is considerable need for an emergency means of communication for system operation or load dispatching in times of storms and line failures, which so affect the telephone lines as to make them inoperative. Radio in such instances should prove a valuable aid to the system dispatcher in restoring conditions to normal. There is no apparent great need for radio for communication with construction camps, but it might well be used in such cases, instead of monopolizing existing lines or building new lines just for this purpose.

Opinion seems somewhat divided as to whether the use of radio for system dispatching should be for emergencies or used as routine. In all probability it would resolve itself down to emergency use, for in the absence of any practical signalling device, the dispatcher would have to be "listening in" at all times, which would very considerably interfere with his routine office work. In an emergency, however, when the telephone line fails, it would be quite the natural thing to turn to the radio set for communication. Construction work would probably justify routine operation, depending somewhat on how extensive the project.

The companies seem unanimously in favor of the undamped or continuous wave system of radio. Recent demonstrations have certainly proven it superior to the damped or spark system in many ways and there is little doubt but that it will entirely supplant the older system. The radio telephone would seem most adapted to system dispatching where speed and accuracy under personal supervision is necessary; while for construction work the radio telegraph should quite well suffice, as the work is not of such exacting nature.

Probably the maximum distance from headquarters that must be reached by any of the companies in order to cover their system, would be 300 miles. On practically all the systems, transmission distances cover all sorts of country, from level valleys to mountains. The climatic conditions are much the same for similar portions of all systems in this district, so that all would have to contend with considerable atmospheric electricity in the summer months, which are, however, fortunately not the season for line failures. The problem of reliable power supply for remote installations is comparatively simple, as in most cases the hydro plants themselves would be the location of the radio; and in the case of construction camps, reliable power lines must be built in order that work of any magnitude may be carried on at all.

The distances between dispatchers' offices of the interconnected companies in this section vary from 5 to 234 miles.

Direct communication between these offices is now to be had by means of the Pacific Telegraph and Telephone Company's long distance service and, indirectly, by relaying phone messages through substation operators over the private lines. The long distance phone is usually quite reliable—but not always, and it is never very rapid. The method of relaying messages is slow and often results in inaccuracies. In several cases the radio requirements of a company in covering its own system have resulted in overlapping the operating headquarters of interconnected systems, which would indicate that the problem of radio communication between dispatchers' offices should not be such a formidable one.

Several of the operating companies have made use of the radio telegraph for construction purposes, with great satisfaction. The Southern California Edison Company makes use of the undamped system and in a typical month's operation, has telegraphed 121,000 words between headquarters and camps. Its operations are over distances of 14 to 25 miles in extremely mountainous country. The San Joaquin Light and Power Corporation utilized the damped system a year ago in connection with the Kern power house job. This operation was over 115 miles of valley country. The Edison Company's sets are rated at $\frac{1}{2}$ -kw. and cost \$1,500.00 each; the sets used by the San Joaquin Light and Power Corporation cost \$750.00 each, and although rated at 2 kw., accomplish successful transmission when using not over 6/10 kw.

The stations were all operated under Limited Commercial station licenses, which were obtained without difficulty or cost and were operated by men holding first grade commercial operator's licenses. There was an occasion on each of these systems where the radio telegraph was called in to assist the dispatcher in handling an operating situation. No extensive experiments have been made by any of the companies with "wired wireless," although it is contemplated. The San Joaquin Company are carrying on experiments with a radio telephone set of 50 watts rating and report that they are having considerable success.

The Radio Corporation of America, who practically control the manufacture and sale of tubes and parts for radio phone sets, have two standard sets on the market rated at 1000 watts and 200 watts, selling for \$7,500.00 and \$6,000.00 respectively, complete in each case with receiving instruments. They have no objection to the power companies buying their tubes and parts for use in experimental work, so long as the work is truly experimental. They go further to say that they probably will be prepared at an early date to take care of limited commercial needs. It is coming to be recognized that if reliable phone sets could be developed at a cost of \$500 to \$750, power companies would be justified in installing them at remote and important plants for the betterment of the service in emergencies. It is understood that the Colin B. Kennedy Company of San Francisco will build up sets of 50 to 100 watts rating at very reasonable prices, so that for experimental testing purposes, power companies will be thus enabled to determine the practicability of radio communication about their systems before spending any great amount of money. In conclusion it might at least be said that the outlook is very encouraging, as with the apparatus on the market, and the right to make limited commercial use of it, there is little to stand in the way of applying it to the use of power system operations.

Some Undiscovered Markets for Electricity in Illumination

Sub-Committee on Illumination Offers Practical Suggestions on the Whys and Hows of Selling Illumination as a Present Day Problem to be Discussed at the June Convention of the Pacific Coast Electrical Association

W. L. FROST, Chairman*

"The man born at the base of a mountain never sees its rugged crest," runs an old saying. This may well be applied to the electrical industry where, at times, we become so engrossed in the details of our work that we lose sight of its greater opportunities.

In the early stages of electrical history the need for "off-peak" load was so emphatic that our commercial men turned their entire attention to power customers, leaving the lighting business to shift for itself.

There are five reasons why this situation should be given our immediate and serious attention.

1. The central stations have passed the period of shortage and now have energy to sell in new markets.
2. So much power load has been developed that the question of "peak" is no longer a dominating factor with many companies.
3. Many classes of lighting business have a load factor that is comparable to the average motor and extend well into the valleys of the load curves.
4. Additional revenue may be secured in most instances without additional investments in distribution systems.
5. Selling illumination, rather than equipment, will raise the electrical industry to a higher commercial plane than it now occupies.

The proper selling of illumination requires the services of trained salesmen, not solicitors. A fiddler makes a noise, but the violinist puts soul into the music. This is no mediocre work. We need salesmen who are artists in their business.

It is the opinion of the committee that these facts are self-evident and require no supporting arguments. Having recognized this situation, let us look over the field to determine where and how illumination may be sold.

At the thirty-ninth convention of the National Electric Light Association held in Chicago in 1916, a very able paper was presented under the title, "Lighting—A By-product or a Buy-Product." In this it was argued that on account of the increased efficiency of lamps the time would come when lighting would become a by-product unless something were done to increase revenue from this source by encouraging the greater use of light. Six years have passed and our industry has made little effort to meet the conditions mentioned in that paper.

The Electrical Industry Must Understand Illumination

Before illumination can be sold, the seller, which is the electrical industry, must be fully informed about the commodity itself. Such is not now the case. The men of the industry, generally, must learn more about this subject before satisfactory results may be achieved. Every facility for study is offered by the lamp and reflector manufacturers. There is no excuse for ignorance.

Still we continue to sell fixtures, glassware, portables and lamps without regard to their design or place of use. This is a condition that must be overcome. The Victrola people do not sell machines and records but "Music in the Home." The automobile industry does not sell cars, but "The Great Out-doors." The public, to enjoy music and travel, necessarily must purchase the appliances that give these results. Sell illumination and the incidental devices to furnish it will have a ready market.

When one goes into a first-class furniture store to purchase a rug the first thing the salesman asks is, "How large

is the room? What is the color scheme? What style of furniture have you?" From these and similar pointers a rug is selected which is appropriate.

When one goes into a certain class of electrical shop to purchase lighting equipment the so-called salesman frequently says, "Here's one for \$19.00 with blue shades or \$18.75 with pink shades," and if you can't get together on that basis, he will suggest it without any shades whatever for \$7.25. Even many of the best concerns in the business will throw their convictions overboard rather than lose a sale.

At this point it is deemed advisable to recommend the immediate adoption by all branches of the industry of the word "LUMINAIRE" to designate a light source instead of the present hybrid term, "fixture." "LUMINAIRE" has been adopted by the Illuminating Engineering society as the expression most suitable for this purpose. To bring this new word into popular use it is suggested that our members use it in their correspondence and advertising and also urge their sales organizations to adopt it in all their transactions. It is also recommended that all luminaires be equipped with "elixits." The fact that this new term is not readily understood by our own electrical people, emphasizes the importance of keeping abreast of progress in the lighting field. This new device has been adopted by most of the big manufacturers and uniform application will be another important step towards selling illumination.

The Markets for Illumination

Let us now examine briefly the market for illumination with the assumption that there is a well-defined and aggressive policy to follow when the market is discovered. This field seems to have five natural subdivisions:

- | | | |
|-----------------------------|--------------------------|---------------|
| 1. Domestic | 2. Commercial | 3. Industrial |
| 4. Sign and flood lighting. | 5. Streets and highways. | |

Of these, domestic lighting in the most loosely handled at the present time. The man building a home should be approached as soon as the foundation is laid—even earlier if possible. He should be fully informed concerning the necessity of adequately wiring and proper illumination. He must be taken firmly by the hand and told that the day of push-cart peddling is over and that the electrical industry now sells Service, Convenience and Comfort. No matter how large or how small the installation may be, it should be considered on this basis and no other. Can this be done with our present method of merchandising? No!

In the commercial field conditions are slightly better, as what might be termed the curbstone operator is eliminated. Still enough of those of meager information and narrow vision remain to obstruct the work of others who are making a sincere and intelligent effort to render good service.

In other branches of illumination; such as industrial, sign, street and highway lighting, the relations between buyer and seller approach the point where real service may be brought about, as installations of this nature are large enough to warrant the attention of specialists. Obviously, the way to improve the situation in selling domestic and commercial illumination is to strive to handle each transaction in the same way as a large street lighting job, viz: Good designs, accurate specifications, and competitive bidding without any possibility of elimination or substitution.

* Committee on Selling Illumination: W. L. Frost, Chairman, C. C. Bartlett, H. H. Courtright, L. W. Davis, C. M. Masson, Robert Prussia, L. E. Voyer.

Taking Advantage of the Opportunity

We cannot hope to take this long stride over night. All branches of the industry interested in selling illumination must first go to school. We must learn to think in foot-candles" and "lumes" as readily as we do in "watts" and "horsepower." There must be no more mystery in "glare" and "diffusion" than there is in "kilowatt hours." This is the first step.

Then, by some means as yet undetermined, we must get together and stay together, not with any thought of controlling price, but with a firm determination that no installation shall be cheapened.

Every new building, of course, is a prospect for luminaires, and the degree of success in supplying them will be the measure of our salesmanship. If we stick to our plan of good designs, accurate specifications and clean bidding we may well proclaim that we have at last entered the realm of real business.

However, our market is by no means limited to new houses and stores. Every substantial structure that is ten years old is a prospect. Or we may put it this way—any building that is not well illuminated according to present standards is waiting for us to apply our skill. There are innumerable "sick" stores that could be restored to active business life by a slight expenditure for proper illumination. These merchants will welcome the "doctor," but so far they have had little opportunity to do so as the doctor has not made his existence known. Are we attempting anything in this field? No. How would the furniture stores fare if they depended on new buildings alone for their market?

What more substantial service could the central station give the rest of the industry than to make a survey of the important buildings that are showing signs of obsolescence? It should not be difficult to convince the owners that a few hundred dollars invested in illumination would hold the tenants that are about ready to move. Then plans could be prepared by the central station's or manufacturer's sales department and the contractor-dealers would handle the work. Frequently such a report will show an actual decrease in kilowatt-hours with an increase in efficiency of illumination—a situation to be welcomed by both the consumer and the central station.

In the same way, much desirable business can be secured from flood lighting. Here is soil that has hardly been scratched. There are occasional installations, but they are rare. Every community has its show place that is a prospect for flood lighting. This is by no means limited to buildings, as it can be applied with equal effectiveness to statuary, shrubbery, and signs. A novelty in the industrial district of Los Angeles is a tall chimney bearing a vertical sign illuminated by flood lights on a flasher. In Westlake Park a group of statuary attracts all who pass at night, while it may readily be missed in daylight. Some day a man with the artist's vision combined with the commercial instinct is going to take up this work and surprise us with the results.

Such installations have an immense educational value and may be made the basis of important work, such as informing the public on the effect of glare on vision and the saving in personal comfort and efficiency with proper illumination. The gas-filled lamp has been a boon to the oculists who are doing their share in advising their patients to guard against bare light sources.

Electric advertising is well established but none but a genuine pessimist would say there is no business here. Old signs can be revived by using the new 25 and 50-watt blue lamps. In this connection we recommend that all signs be wired with a capacity of at least 50 watts for each receptacle, so that larger than the customary 10-watt lamps may be used when desired.

There are many obsolete signs that should be replaced. Here again the power company might make a survey and uncover a lot of desirable business. Also there is a potential market for signs in our wholesale districts. For instance, Los Angeles Street in Los Angeles carries a heavy traffic after dusk. It should take but little sales effort to place signs with these wholesale concerns whose products are generously advertised in other parts of the city.

Further study will suggest many other unsuspected sources of revenue. For example, orange packing houses frequently have to expand on account of increased business. With adequate lighting this expense could be avoided, as they could run night shifts during the rush period.

Highway lighting is coming to the front. More than one road is so crowded that plans to widen it are before the supervisors or commissioners. First-class lighting, making night travel convenient and safe, would be the logical answer. This applies particularly to trucking, which offers no serious obstacle to night operation. But we can hardly look for such an achievement unless our own family gets behind the idea.

Do Not Leave Business to the Peddler

Recently our industry has observed the performance of a quick-action peddler who fills the back end of a Ford with so-called fixtures and proceeds to market them. He has but one design and he sells this in stores, barber shops, pool rooms and offices regardless of the results. He makes a quick sale, he never comes back and his business is so good that he receives his supplies in carload lots.

There are two things wrong with this sort of work. In the first place, the purchaser gets light rather than illumination and in the second place, this trade should go to the established contractor-dealer in the neighborhood. Why the contractor-dealer lets such things occur can be explained only by the contractor-dealer. Reading papers in conventions will not stop it.

Practical Ways of Getting Business

This brings us back to the starting point which is—ourselves. Let us go home and put proper illumination in our offices, stores, warehouses and shops. Let us arrange some displays that apply to particular lines of trade. If we want to sell to drug stores we should have the ideal illumination for a drug store to start with and this must be secured by hook or crook. If we are after show window business, then our own windows must be perfect.

Then let us learn our trade. Nothing better can be done in this convention than to take a pledge something like this: "Henceforth I will study diligently that I may learn my craft and having learned, I will play square."

For the good of the industry this work must get started. It is immaterial who starts it for all will share in the profits. The California Electrical Cooperative Campaign is as good a medium as any to guide the work, but the electrical jobbers, dealers and central stations will have to pitch in, for ten cooperative campaigns would be inadequate without team work all down the line.

Cooperative advertising would help. Possibly some of the power companies would give part of their regular newspaper space to this subject. The lamp and reflector manufacturers are ready—have been for ten years. Expert advice may be had for the asking. All we need is someone to give us a push.

We have, indeed, been sitting at the base of the mountain, unable to raise our eyes to its crest. Business, to a degree undreamed of, is on every side. It can be acquired if we will carry to our work the same spirit of fair play and willingness to learn that characterizes convention activities. The harvest is plentiful and the laborers are few.

Providing For Accuracy in Power Company Meter Records

Good Practice in Meter Installation and Testing, as Well as Advisable Organization of Company Meter Departments Discussed in Convention Report of the Meter Committee of the Pacific Coast Electrical Association

W. R. FRAMPTON, Chairman *

Recording instruments play a most important part in the generation and sale of electricity. Not only do they constitute the contact point with the consumer, but their accurate information is the basis upon which many of the operating policies of the company are based. The problems of this department in the selection and care of meters form the subject matter of the report of the meter committee of the Pacific Coast Electrical Association which follows:

Due to the need of some sort of standard training course for metermen, the committee recommends that the handbook be re-arranged and printed in two volumes, one volume to include a complete graded training course for metermen, this course to be augmented by references to various authorities on meters, also questions and answers.

Demand Meter Scales

The committee suggests that the following scales be selected as being most suitable, in preference to those as recommended by the 1921 National Meter Committee.

"The full scale value of a 5-ampere, 110-volt single phase meter to be .75 kw.; of a 5-ampere, 110-volt, 3-wire, 3-phase meter to be 1.25 kw.; of a 5-ampere, 110-volt, 3- or 4-wire 2-phase meter to be 1.5 kw. of a 5-ampere, 110-volt, 4-wire 3-phase meter to be 2.25 kw.

"Larger meters to have a full scale value in proportion to their capacity."

It is also recommended that the above scales apply to all types of demand meters. The 1921 National Meter Committee Rules were made to include only watthour meters which have a demand scale on the dial.

Standard Design of Meters and Instruments

All are agreed that the dimensions and styles of mountings, also current transformers should be standardized to a greater extent than at present. The majority of the com-

as agreed upon by the different manufacturers. This will mean a great saving in the future on account of protective devices which are rapidly being acquired in these states. It is recommended that polyphase indicating switchboard wattmeters should be supplied with four potential posts and four standard posts as it makes it a more universal instrument.

PERIODIC TEST OF METERS

The committee presents in table 1 the rules of various state committees covering frequency of periodic tests.

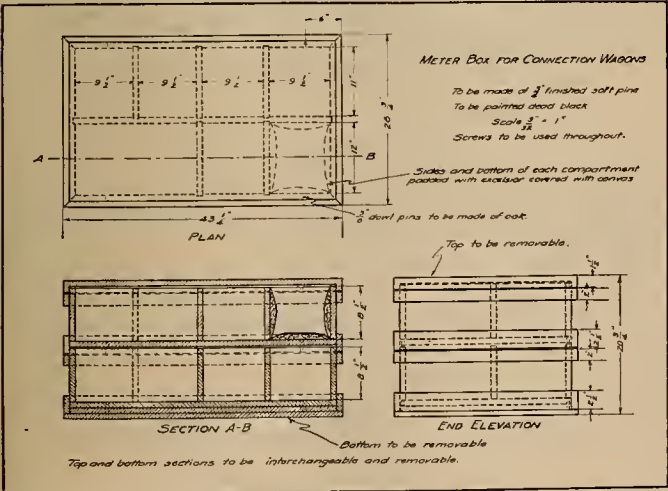
Table 2 is a statement of the practice of various Pacific Coast utilities, together with the percentage of correct meters in each class, as nearly as this can be determined. As most companies classify by type of meter rather than size in preparing their accuracy records, these figures are somewhat approximate.

A comparison of the two tables shows clearly that excepting some cases of single phase meters, the average of practice in California is within the average of Commission requirements. It should be noted that Company G, with a test period of five years in the case of small single phase meters, finds nearly the same percentage of correct meters as Companies B and C, with a three year test period.

Believing that a need exists establishing an ideal test period for small single phase meters, the committee has collected data covering several thousand tests of meters of this class (5-25 amperes). These tests were made by several California utilities, the test period ranging from one to ten years.

Sheet 1 shows the number of meters included in each test period. Sheet 2 shows the distribution of tests, both as to companies submitting data, and to type of meter. From these two sheets it will be seen that in each of the first five periods the tests are sufficient in number and well diversified. In the last five periods the tests are few in number, and were all submitted by one company; they therefore cannot be considered as average.

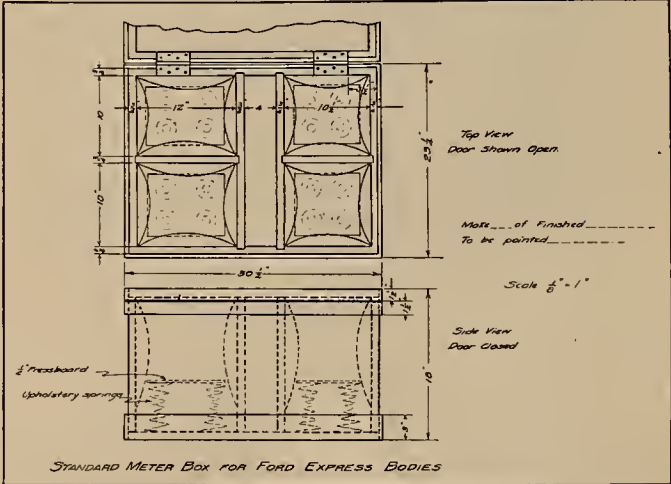
On sheet 3 are given, in percent of meter tested in the particular period, the meters which were found with errors not



The committee recommends the use of a box with separate containers for use in transporting meters from the storeroom to the point of their destination.

mittee is on record as being in favor of a standard disc constant if the same could be accomplished without too great a hardship on the manufacturer. The base of a single phase meter should also be designed to some standard dimensions

* Meter Committee: W. R. Frampton, Chairman, Otto Knopp, C. F. Gilchrist, G. H. Seerle, C. S. Hull, J. E. Bridges, H. C. Abel, J. C. Alberts, L. A. Nott, J. M. Morris, M. H. Schnapp, N. L. Linblad, R. G. Jones, L. H. Beebe, T. W. Snell, W. R. Vanboklen, W. H. Talbot, Lon Johnson, L. D. Tyer, A. S. Price, J. O. Case, P. J. Dellinger, H. R. Thomas.

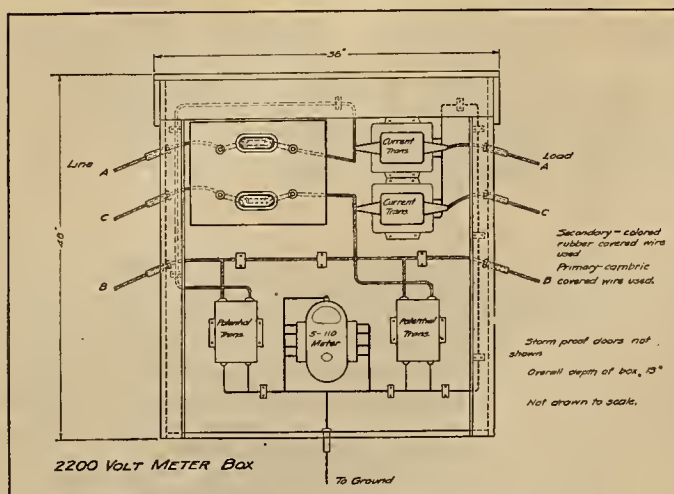


There can be great damage done in the shipment of meters which are not properly packed. A specially designed box fitted to the wagon body obviates all danger of injury to the meter.

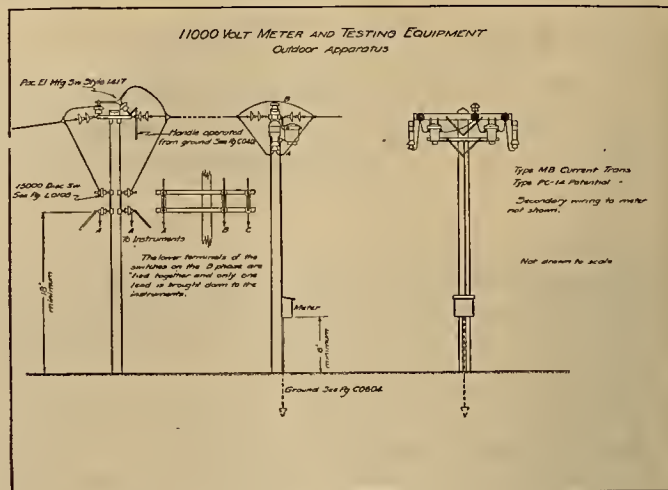
exceeding two percent, and also those with errors not exceeding four percent. It will be noted that the percentage of correct meters at the end of a five year interval is almost identical with that at the end of an interval of one year.

Sheet 4 consists of a summary of all test results, and is submitted as a matter of interest.

It is the conclusion of the committee that five years constitutes the ideal test period for single phase induction meters of five to twenty-five amperes capacity, and types



2,200-volt meter box showing connections and layout



11,000-volt meter and testing equipment—outdoor apparatus

which conform to the requirements of the National Electric Light Association's Meter Code.

MAINTENANCE OF SWITCHBOARD METERS AND INSTRUMENTS

1. Switchboard meters, instruments and relays should, wherever possible, all be placed on the front of the board. Indicating instruments are always placed on the front of the board, but meters and relays are often placed in the rear, either on the framework of the main board or on separate panels which face to the rear of the operating room. The ideal arrangement would be to group all meters, instruments and relays which belong to a given circuit together on the front of one panel. Such a plan would avoid confusion and greatly assist the station operator in the performance of his duties. All meters, instruments and relays should, if possible, clear the floor by at least twenty-four inches.

2. The Committee is of the opinion that some standard scheme of connections for meters, instruments, and relays would be desirable, but fear that great difficulties would be encountered in this direction. One company has adopted a standard scheme of connections for watt-hour meters. The plan has proven to be of great help to men engaged in testing station meters.

3. Colored wire should be used in connecting meters, instruments and relays to instrument transformers. Some prefer to carry the colors through to the meter studs, while others would end the colors at a terminal board located on or near the main switchboard. If proper wire could be obtained it would be very desirable to run colored wire directly to the meter studs.

4. Test links should be provided for secondary testing. Some means for cutting transformers in on a dead bus would be very desirable for those companies which make overall tests. In many cases this would mean in the future a great saving in time and labor.

5. It is desirable for any central station to adopt a standard type of station instrument as far as possible. Such standardization greatly improves the appearance of the switchboard and decreases the cost of maintenance.

6. Opinions are divided on the advisability of connecting low energy relays in series with meters and instruments. It is believed that a few experiments in this direction may prove that such connections may be made. The results will be a decrease in the cost of many installations.

7. Meters and instruments should be tested and adjusted on the switchboard whenever possible. However, one company has made it a practice to remove, at regular intervals, certain important meters to the laboratory for test. They believe that greater accuracy can be obtained in this way.

8. Important watt-hour meters should be tested periodically. Some central stations advocate regular inspection of relays, while indicating instruments as a rule are checked only when occasion demands.

9. Station meter testers should understand relay testing and should be prepared to make tests as occasions demand. On the other hand, where relays in large numbers are tested periodically, more efficient service may be obtained by special relay testers.

10. Overall tests should be made on relays wherever possible. A secondary test on a hot switch does not permit mechanical adjustment of tripping mechanisms.

11. A portable relay testing outfit should consist of a loading transformer sufficiently large to supply the largest current required. Two different companies have found that small lighting transformers rated 110/220 to 11/22 volts are very convenient. Such a transformer will stand a very large overload for the short time required in testing a relay. A regulating rheostat, a cycle counter, S. P. Power Factor meter and a suitable ammeter with leads and switches, complete the equipment.

12. A permanent and complete record of relay tests should be kept. Few companies have developed relay testing to the point where permanent record cards have been provided.

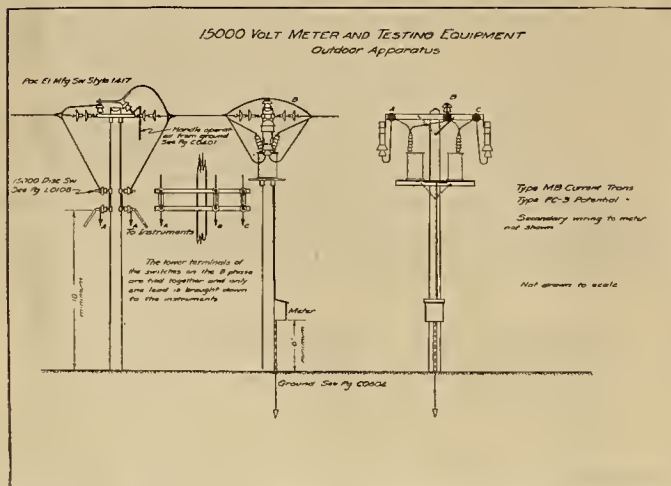
13. All relays should be tested before installing. A check on time and current settings as well as insulation tests when made in the laboratory, may save much time and confusion.

14. Relays should be given one calibration to serve for all the year. In special cases, however, it becomes advisable to change relay settings at certain times of the year, in order to give satisfactory service.

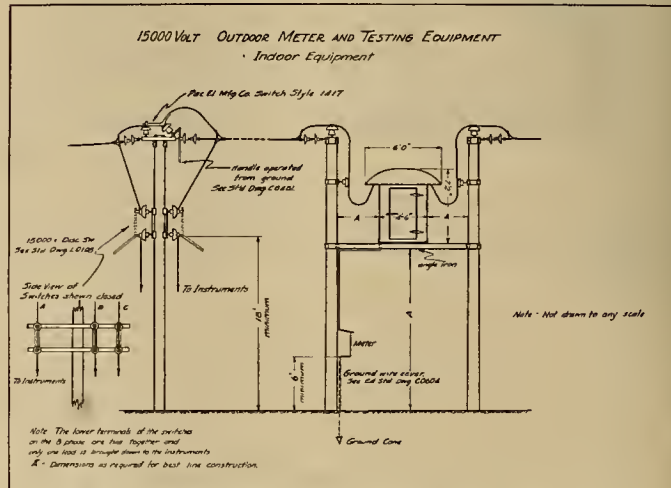
15. It is recommended that all switchboard meters, D. C. and A. C., be of the same dimensions in any given station.

Measurement of Kva. and Power Factor

The compilation of methods for the measurement of reactive power is by this time quite complete, and we have received no suggestions for improvement on the comprehensive summary given in the 1921 report of the National Meter Committee.



15,000-volt meter and testing equipment, showing outdoor apparatus



15,000-volt outdoor meter and testing equipment—indoor equipment

A number of the simpler methods of metering depend for their accuracy on the assumption of balanced load. One of our companies reports that they are making power-factor surveys by connecting a single-phase meter in series with one of the elements of the polyphase meter already in service, determining average power-factor by the ratio between the single-phase reading and the difference between polyphase and single-phase readings. This method, while convenient and sufficiently accurate for the purpose of such a survey, should not be considered for permanent metering on account of its inaccuracy on unbalanced load.

The measurement of reactive kva. by interconnection methods often involves odd voltages and constants. Some manufacturers eliminate these and adopt the ordinary meter to such service by the use of auto-transformers. It is obvious that such transformers introduce additional ratio and phase angle errors, and preference should be given to specially designed meters for this work as soon as they are available.

The measurement of apparent power or energy is still in its infancy in comparison with that of reactive power. It is by no means difficult to design an instrument which will record the true product (arithmetical) of current and voltage at any definite power-factor selected, but the problem is much complicated when the power-factor varies over a considerable range.

Fortunately it is possible, when a meter is connected and calibrated to read true kva. at some definite power-factor, to establish a considerable zone on either side of that power-factor, in which the meter will not exceed a certain error, say two per cent.

Descriptions were submitted of meters which are being developed along these lines.

Parallel Connection of Current Transformer Secondaries

The work of the above committee was to determine the accuracy of metering more than one circuit by paralleling the current transformer secondaries and using but one meter when a number of circuits are to be totalized or where it is desirable to save equipment. Some tests were made, but due to lack of time, the tests were not carried out as thoroughly as desired. As far as the committee's work has gone it is of the opinion that this method of metering is commercially accurate.

The committee's report was accepted as a "progress report," and further investigation of the accuracy of this method on various conditions of loading of the various circuits will be made.

Efficiency of Meter Testers

The subject, while very important to public utilities, is one which seems to have received very little attention. A canvass of the various companies operating on the coast seemed to indicate that very few meter departments were keeping any systematic records of the efficiency of their testers, so that it was very difficult to draw any conclusions.

Some figures were submitted, but were difficult of comparison as the number of tests per day per man seemed to depend on nature of territory, means of transportation, amount of attention given to meters and the type of test made.

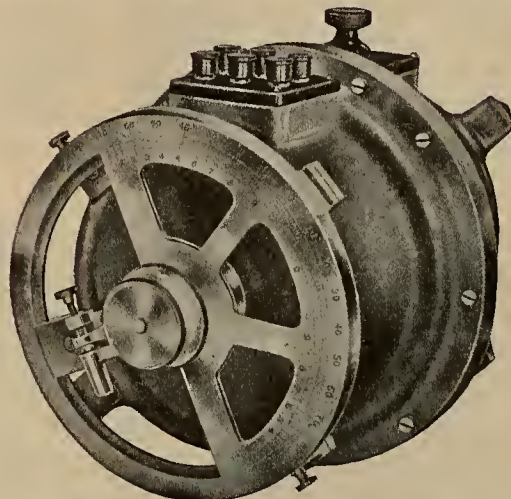
Overall Versus Secondary Tests

The above subject is considered more as a method of doing work than as a standard of construction and each one has individual views on how the work can or should be executed. One thing seems to be agreed on and that is that primary testing calls for meter testers of a higher order of reliability than when secondary testing is done. This is a point that should be emphasized, especially in the smaller companies.

The committee favors primary testing on all meter installations.

Test Records and Departmental Costs

Information received from various members of the committee on this subject shows, as expected, a wide divergence of practice. This ranges all the way from very elaborate records to almost none at all. In the majority of cases a permanent record of test is kept on the meter history card, but in some instances the original test card, when filed, is the only record kept of the test. Opinions differ as to the length of time original tests should be kept; some keep them indefinitely, some five years, some one year, and in one case they were destroyed immediately. One large company keeps original tests as long as a meter remains at the same location, and destroys them one year after removal of meter. Another files original tests according to the accuracy of meter as found, and makes them up into a comprehensive report for the management at the end of the year, after which they are



With the "Albert" phase shifter recently developed in the West, any desired power factor, either leading or lagging, may be obtained as quickly on a three-phase as on a single-phase circuit.

destroyed. Some sort of meter efficiency report is usually necessary on account of reports asked for annually by the Railroad Commission. The manner of making up a report will depend as a rule on the volume of tests handled.

It is obvious that an elaborate system of records involving several different cards in separate files for each meter may be handled much more easily by a small company than a large one. Not only does the multiplication of files become cumbersome on a system with many meters, but the labor involved in posting records on duplicate cards is a serious cost item. Close scrutiny is therefore needed to see that only indispensable records are kept, and that these are not duplicated by records kept in other departments.

Another matter too often given slight consideration is that of a safe place for keeping records. A little figuring as to the cost of replacing meter records—if they can be replaced—after being destroyed by fire, should convince the most skeptical management that a fire-proof vault would prove a good investment.

Proper efficiency cannot be secured in the meter department without some form of cost record to show what the men are doing individually and collectively, by comparison with each other and with past performance. A surprisingly large number of companies keep no such record. A weekly or monthly report is preferable, with totals carried forward so that the work for the year is quickly summed up at any date. The work of keeping up such data is inconsiderable with respect to the benefits gained.

A typical form made up weekly from the weekly time-cards of the men shows meters tested, repaired, etc., and hours per individual, also meters per hour and totals for each group or class of tests. The actual cost per test is not given

on the form, but may easily be extended by using the average wage for the class of test considered. Another of these forms shows the weekly additions and removals of meters on the system by districts.

Cost records are made up in some companies by the accounting department in conjunction with time keeping and other accounting data. In our opinion, it is much more satisfactory to have this handled by the department itself, as the cost record is an engineering feature rather than an accounting one, and demands different methods. Of course, the accounting records should be made use of wherever it will avoid duplication or work.

Transportation of Meters to Consumers Premises

The committee recommends that some container should be used in the transportation of meters from the meter department and stores to the point of installation. Preferably it should be a box of some description with separate container for each meter. Each central station can work out its own development and ideas, either by exchanging practices or private development.

It is very important that meters should be handled more carefully than is the present practice of the majority of central stations, as it is very vital.

There is great damage in shipment of meters that are not properly packed, which results in meter inaccuracy as well as considerable expense in repairs and testing. In a great many cases the men who handle the meters after they leave the meter department, are not experienced metermen and do not realize the necessity of the great care that is necessary for protection.

If proper methods are observed as stated above, it is thought the conditions will be improved to a marked degree.

PROPER CAPACITY OF METER TO INSTALL FOR VARIOUS TYPES OF INSULATIONS AS RECOMMENDED BY COMMITTEE

Type of Installation	Suggested Meter Capacity*
Residence and Apartment Lighting.....	25%
Store and Commercial Lighting.....	70%
Sign and Window Lighting.....	100%
Foundry and Machine Shops.....	40 to 60%
Saw Mills	60%
Fruit Packing Plant.....	75%
Raisin Packing Plant.....	50%
Milk Depot	100%
Flour Mill	100%
Gravel Pit	80%
Ice Factory	90%
Box Factory and Planing Mill.....	75%
Cotton Gin	50%
Irrigation	100%
Small industrial plants with individual group drive.....	50%

* In per cent of connected load.

Weatherproof Protection for Watthour Meters

As a result of a general survey made among the principal power companies in California on the subject of weatherproof protection for watthour meters, this committee wishes to report as follows:

With few exceptions painted wooden boxes are used for weatherproof protection for watthour meters and particularly in the case of single phase lighting meters where back porch or "built-in boxes" in residences are not available. For polyphase and 2,200-volt primary installations, both wooden and metal boxes are used, the instrument transformers generally being housed in the same box.

2. Most of the power companies make their own boxes at an average small cost for single phase motors. For polyphase and primary installations the cost is somewhat higher.

3. There is a considerable difference of opinion on the question of housing fuses and service switches in the same box with meters, but it is the majority opinion that this is an advantage, particularly in the case of residence lighting installations.

4. A properly designed weatherproof metal box with the meter insulated from it would undoubtedly meet with general approval by the power companies, provided such box can be obtained at a cost reasonably comparable with that of wooden boxes.

Outdoor Metering

There is a general feeling, especially in the West, that outdoor metering is not only a legitimate practice, but a very necessary one.

Practically all companies on the Coast are using outdoor equipment. The general methods of metering for the ideal outdoor equipment consists of weatherproof potential transformers and current transformers installed on the pole and meters placed approximately six feet from the bottom of the pole in a standard meter box, and the installation provided with safe and easy methods for making either primary or secondary tests, a description of which can be taken from the photographs and drawings as shown.

Testing Facilities on Safety Entrance Switches

It has become imperative that some testing device be installed on safety entrance switches, since all installations are required by law to be ironclad and in conduit.

The three principal reasons are as follows and as to their importance:

1. Safety for party making test.
2. Non-interruption of service while testing.
3. Flexibility in speed of testing.

There are many methods by which testing facilities can be installed to give the desired results, and in view of the apparent necessity for such equipment central stations on the Coast are standardizing on certain devices which seem the most applicable to their needs.

Testing of Large Polyphase Meters in Service

The most accurate method for this class of testing depends to some extent on the local conditions. If possible, "overall" test should be made on consumers' normal load using standards calibrated at this point. In case the load is variable "phantom" loading at different points may be preferable, provided power factors used cover the range of service conditions. If meter is to be tested on the secondary in service, it should receive preliminary "primary" and "secondary" calibrations and the necessary corrections made on all subsequent tests.

Measurements of Demand and Demand Meters

Demand meters used on the Coast are mainly of the block interval type, both indicating and graphic, with a considerable number of "lagged demand" and thermal storage meters. The sub-committee discussed some of the troubles encountered in these types, and reports on late developments in "demand registers" which are fitted directly to the watthour meter.

Testing of Current and Potential Transformers

The testing of instrument transformers separate from their meters is mainly essential where secondary methods are employed in meter calibrations.

Transformer characteristics may be determined either by absolute measurements or by comparison with a standard of the same nominal characteristics. The latter class of testing has had the greatest application in public utility work, particularly in the watthour meter method described in Scientific Paper No. 233 of the Bureau of Standards. The time required for tests by this method is its main disadvantage.

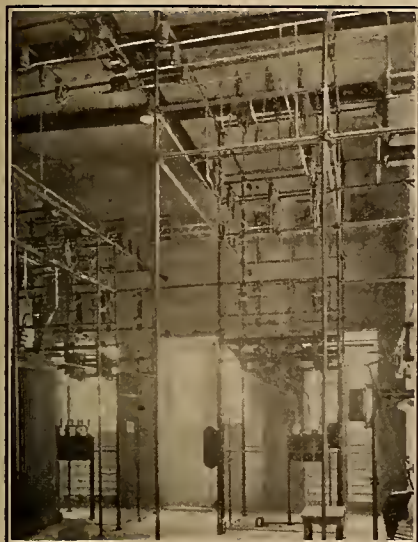
Another comparison method for potential transformers is described in Scientific Paper No. 217 of the Bureau of Standards. In the "comparator voltmeter" form and with the proper accessories this method is very rapid.

The comparison method presented by F. B. Silsbee in Bureau of Standards Scientific Paper No. 309 is attaining considerable popularity. The industry is looking forward with interest to the compact testing sets which are being developed along these lines.

"Albert" Phase Shifting Transformer

Under new developments and test facilities the committee discussed a phase shifting transformer recently developed on the west coast.

This transformer consists of stator and rotor elements of laminated steel, each being wound with a three-phase wind-



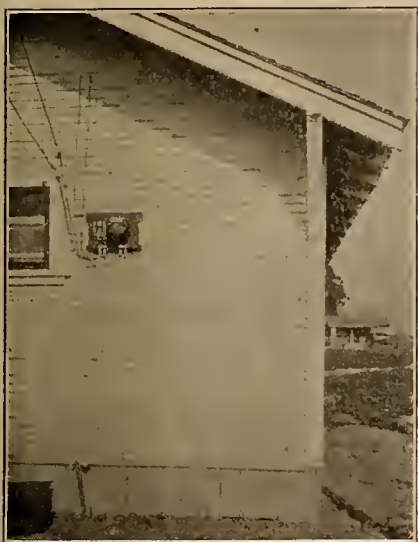
15,000-v. indoor installation showing five disconnecting switches (just above screening) used for cutting in testing transformers on primaries without interruption of service.



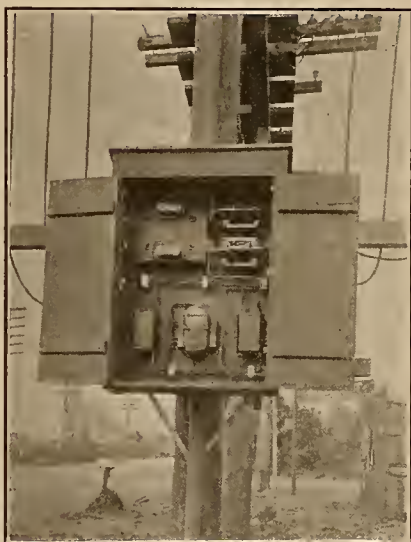
Test switches on 15,000-v. outdoor installation. Primary testing calls for meter testers of a higher order of reliability than when only secondary testing is done.



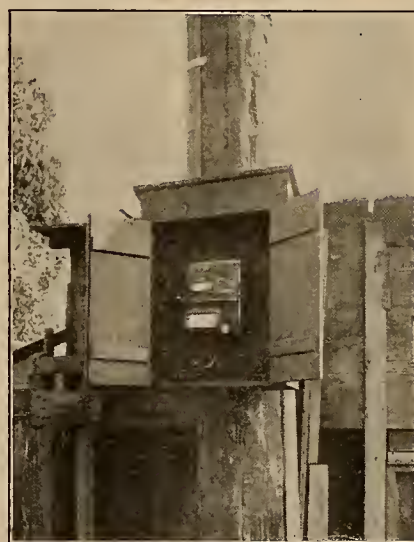
Testing switches on indoor 15,000-v. installation. Standard current transformers may be cut in series with primary without handling energized circuits or interrupting service.



Typical residence meter with box front removed. The front is held by two hooks and its removal leaves the meter completely accessible for test or repair.



2200-v. outdoor meter installation. Note the primary testing panel in the upper left hand corner. Both metal and wooden boxes are used for this type of meter.



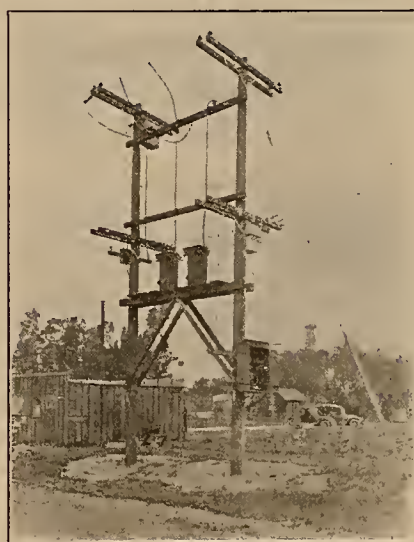
Close-up of meter box and meter on the 15,000-v. installation shown in other views. The typical installation shows the meter box about six feet from the bottom of the pole.



15,000-v. outdoor meter installation with indoor type transformers in galvanized iron box. The meter is shown in the wooden box below. Testing switches appear on the pole at the left.



Another 15,000-v. outdoor meter installation with indoor type transformers in metal box. With few exceptions painted wooden boxes are used for housing meters.



2,200-v. outdoor meter installation, showing both meter and transformers in wooden box. Most of the California power companies make their own boxes at an average small cost.

ing. The rotor may be turned through an angle of three hundred sixty mechanical degrees and locked at any position. An index dial, attached to the rotor, moves adjacent to a stationary scale which is calibrated in electrical degrees. Upon the index plate itself are laid off the cosines of the electrical angle through which the rotor is shifted. This allows the direct reading of both the electrical angle of displacement between primary and secondary and also the power factor corresponding to this angle. Means are provided for setting the index plate at a known power factor to compensate for

any phase angle existing in the current circuit of the watt-hour meter. A micrometer movement is also provided to assist in making accurate settings of the desired angle.

With this device any desired power factor, either leading or lagging, may be obtained as quickly on a three-phase as on a single-phase circuit.

The complete apparatus is made up for either portable or switchboard use. The portable type is enclosed in an aluminum, dust-proof housing, is equipped with leather handles, and weighs about forty pounds.

TABLE 1 — "PERIOD BETWEEN TESTS — MONTHS"

State	Single Phase			Polyphase Self-Contained			Polyphase With Inst. Trans.			Commutator & Mercury Type			
	5-25 Amp.	5-50 Amp.	Over 25 & 50	To 25-Kw.	26-50	Over 50-Kw.	To 25-Kw.	26-50	Over 50-Kw.	5-15	5-50	50-500	Over 500
Missouri .....	....	24	12	....	....	....	....	....	....	....	12	6	....
Colorado	36	....	24	24	24	12	....	....	....	24	18	12	....
Indiana	36	....	24	18	18	12	....	....	....	....	18	12	6
New Jersey	30	....	24	24	24	12	....	....	....	....	18	12	6
Connecticut	36	....	24	18	18	12	....	....	....	....	18	12	....
Wisconsin	48	Code		....	....	....	....	....	....	....	....	....	....
	24	Non-Code		....	....	....	....	....	....	....	....	....	....
Dist. Columbia	36	....	24	24	24	12	....	....	....	....	18	12	8
Illinois	48	Code		24	24	12	18	18	12	....	12	12	12
	30	Non-Code		....	....	....	....	....	....	....	....	....	....

TABLE II — "PERIOD BETWEEN TESTS — MONTHS"

Company	Single Phase				Polyphase Self-Contained			Polyphase With Inst. Trans.			Commutator & Mercury Type		
	5	10-25	25-50	Over 50	To 25-Kw.	26-50	Over 50-Kw.	To 25-Kw.	26-50	Over 50-Kw.	5-50	75-150	Over 150
A .....	....	....	....	12	12	12	12	12	12	12	18	12	6
B	36	12	12	12	12	12	12	12	12	12	6	6	6
C	36	36	36	24-30	18	18	12	12	12	6-12	....	....	....
D	36	36	36	36	12	12	12	12	12	12	....	....	....
E	24	24	12	6	12	12	12	....	12	12	....	....	....
G	60	60	60	24	24	24	12	12	12	12	12	6	3
F	Period based on annual consumption varying from 6 yrs. for residences to 1 yr. for large power installations.												

Percent of Meters Found Correct

A .....	....	....	....	....	....	90	....	....	....	....	....	44
B .....	....	90.6	....	....	....	91.1	....	....	....	....	....	47.5 light
												54.5 power
C	87	....	....	89	90	....	90	....	89.5	95	....	....
D .....	....	....	....	....	....	....	....	....	....	....	....	....
E	96.6	....	100	68.7	92.8	88.3	81.4	....	100	86.6	....	....
F .....	....	....	....	....	....	....	....	....	....	....	....	....
G	85	....	....	....	....	....	68	....	....	....	....	33

Factors in Reducing Costs in Underground Construction Work

Western Power Company Practice in the Use of Underground Cables Under Local Climatic Conditions, With a Discussion of the Possibilities of Cost Reduction in Underground and Submarine Cable Installations

E. ROY COWLES, Chairman*

The subject of cable operating temperature is becoming more and more important on the Pacific Coast, with rapidly increasing loads, larger cables, higher voltages and more crowded duct lines. Considerable has already been written on methods of determining cable operating temperature when the load, cable characteristics and duct temperature are known, and these methods are quite generally accepted as reasonably accurate. Our studies to determine the heat dissipating properties of duct lines under the Pacific Coast conditions should supply the missing link.

Temperature surveys show that the duct line temperature varies only slightly with short time (daily or weekly)

cyclic changes in cable loading and changes in atmospheric temperature. It requires several days of extremely warm weather to produce any appreciable change in the temperature of the duct line; the daily load variation, even with extremely heavy peaks, produces little or no change.

The duct line temperature is a function of the mean square value of the load over a definite interval of time (such as a day or a week), but the temperature of the cable conductor follows quite closely the variations in cable loading.

The normal temperature of the earth, which is not in proximity to heat producing underground structures, at the depths at which conduit lines are usually built, responds very little to periodic changes in atmospheric temperature, and lags considerably behind them.

In a period of 22 days, during which the tests were in

* Underground Systems Committee: R. Roy Cowles, chairman, E. R. Northmore, F. B. Lewis, K. B. Ayres, R. C. Powell, N. B. Hinson, P. E. Chapman, E. N. D'Oyly, C. A. Heinze, L. J. Moore, H. G. Keesling, V. R. Smith, M. O. Bolser, Geo. Hagar, C. H. Holladay, C. H. Jenkins.

progress, the temperature varied from 3° C. to 15 C. above zero, with several successive days of sustained cold weather. During this same period, the oil temperature varied only from 10 to 11.5 C., and remained constant at 11.5 for seven days, during which time the temperature of the atmosphere was steadily falling.

This factor is of considerable importance and advantage to Pacific Coast companies, since the periods of warm temperature are of rather short duration, and even at such times the nights are usually cold; the average 24-hour temperature, therefore, being comparatively low. We do not have the extremely low winter temperatures experienced by eastern companies, which, although permitting of heavier loading, offer other obstacles to cable operating.

From the data already at hand, it appears that a definite relation exists between the average temperature of the atmosphere and the average temperature of the soil under conditions given, and that reasonably accurate determinations of soil temperature can be made if the average atmospheric temperature for a certain period is known.

Tests are also being made to determine relative temperature in different ducts of the same run, under various conditions of loading, as well as relative temperature along the duct run. Complete returns on these tests are not yet available, hence cannot be included in this year's Underground Report; but we feel that the results so far attained are very encouraging and that this work should be carried on by the incoming committee.

Reduction in Cable Insulation

A tendency toward reduction in thickness of paper insulation during the last year or so is noticeable, not only among eastern central stations, but also on the Pacific Coast. One Pacific Coast company has reduced the insulation for 500,000 cir. mils 3-conductor sector cable, for 11,000-volt grounded star operation to 6/32 in. by 4/32 in. paper. The same company had formerly specified 13/64 by 13/64 for 4/0 round or sector cable, at the same operating voltage. Even greater reductions are reported by the eastern and middle West companies, one company in the middle West reporting the recent installation of several miles of 500,000 cir. mils, 3-conductor 12,000-volt cable, 4/32-in. paper insulation and 2/32-in. paper belt with 1/8-in. lead. This cable was installed in 3-in. ducts and 450-ft. maximum pulls—maximum carrying capacity of 375 amps.

Possibilities of High Voltage Cables

With the increasing difficulty of bringing high voltage overhead lines into cities for connection to step-down substations, high voltage underground cables assume still greater importance. It is generally understood that there were a number of installations of high voltage cable in Europe, operating at 60,000 volts and above. It appears on further investigation that there are no installations operating at such potentials at the present time, although the cables have been designed for high voltages. There is an installation in Paris of 60,000 volts, single conductor cable installed in 1921, which is reported to be operating at a potential considerably less than this. There are a number of installations in England and on the continent operated at 33,000 volts, 3-conductor, and also such cable was installed in Chicago in 1921. Cable manufacturers, both in England and the United States, are now prepared to take orders for 35,000-volt, single conductor, paper insulated lead covered cables, which would permit of operation on 60,000-volt, 3-phase star grounded systems. We are also informed that some of the English cable manufacturers are now constructing some 50,000-volt, 3-conductor cable, and that they regard 44,000-volt, 3-conductor cable as a simple commercial proposition. There appear to be no reasons why such cables cannot operate as successfully as the many miles of 33,000-volt, 3-conductor cable now in operation.

The highest voltage cable in use on the Pacific Coast at the present time is 30,000-volt, 3-conductor, and is operating at that potential.

With increase in loads and voltages, necessitating large copper or heavy insulation, or both, it appears that 3-conductor cable must of necessity in many cases be supplanted by single conductor cable. The operation of such cable on a 60-cycle current introduces certain operating difficulties, but it appears that the advantages offered by such cable more than counterbalances the disadvantages in operation.

With the lead sheath open circuited, that is, bonded at one end only, the voltage induced in the sheath may, for long lengths and heavy loads, reach a dangerous potential. For example, a 1 million-cir. mils, single conductor cable with solid core and 12/32-in. paper insulation and 1/8-in. lead, and having an over-all diameter of 2.5 in., will at 60 cycles and 6-in. spacing between phases, have an induced sheath voltage of 4.1 per 1000 ft. to neutral at receiving end, with 100 amps. flowing in the conductors. It is thus seen that on long lengths, this potential would cause serious operating difficulties. This condition must be somewhat overcome by the use of insulated joints at convenient intervals, or by bonding lead sheath in every manhole, not only between cables, but also a common grounded neutral.

It is to be noted that the induced voltage for a given spacing decreases with cables of larger over-all diameter, while the reactance, impedance and induced voltage for a given cable increase with the spacing. The lead sheath, when open circuited, that is, bonded at one end only, has no effect on the reactance or effective resistance.

Bonding the lead sheath at more than one point completes the secondary circuit, permitting current to flow through the sheath. The amount of this sheath current varies with the current in the conductor, with the overall diameter of the lead sheath and very materially with the resistance of the bonding circuit, as well as with the spacing of the conductors. A test reported by Clark and Shanklin in the Proceedings of the A. I. E. E., June 1919, shows that the effective resistance of a single conductor cable, 1-million cir. mils, having an over-all diameter of 2.7 in. varied from 5% to 100% above normal with different values of resistance in the sheath bond circuit.

The heating, due to the current of the sheath, raises the temperature of the cable insulation in the same manner as the heat produced in the conductor. It is therefore apparent that sheath currents will reduce the allowable carrying capacity of the cable.

Tests on 500,000-cir. mils single-conductor cables with 10/32-in. insulation and 6-in. spacing, show that this carrying capacity is reduced about 10%, with the bonds as used in this test. At 14-in. spacing the carrying capacity was reduced 18%. The smaller conductor cables showed correspondingly smaller percentage of reduction.

It appears, therefore, that the operation of single conductor cables on 60 cycles, when properly bonded, offers no very serious objection. The slight reduction in carrying capacity, due to the sheath currents, is more than offset by the economies of this cable over multiple conductor cable for large sizes and higher voltages. Some of the Pacific Coast companies are using single conductor, lead covered cables for connection between transformer banks and buses in large capacity substations. The runs are not long, seldom exceeding 200 ft. In some cases cables have been bonded, and in some cases unbonded.

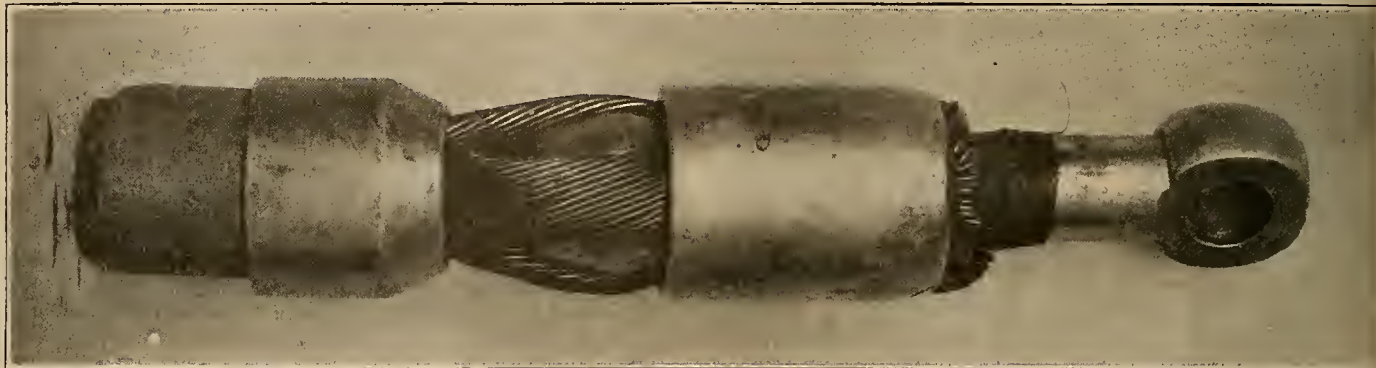
Experience With Submarine Cables

Conditions around San Francisco Bay have made the use of submarine cable not only economical, but necessary. Two cables crossing the Bay have been in operation for ten years and are still in operation. Two cables laid in 1915

across the Golden Gate are still in operation. These cables are 4/0, 3-conductor, rubber insulated, lead covered, and armored, and are operated at 11,000 volts. Both operate in a locality where the tide run is very swift and they are subject to dragging anchors, sharp-projecting rocks and other conditions which have caused damage to the lead sheathing. From the observation of these and other similar installations,

fuses are used. No attempt is being made to protect from ordinary overloads, but for extremely heavy overloads or short circuits, and the transformers are operated in parallel.

An objection to most junction boxes is the large amount of space required, and in many cases standard manholes are too small to accommodate the necessary transformers, junction boxes and other equipment. This applies particularly to con-



Cable pulling device designed and used by one of California companies for pulling 500,000 C.M., 3-conductor, 11-kv. cable.—By the use of this device the strain is taken by the conductors, instead of the lead sheath and the amount of cable wasted is reduced to a minimum. The time required to apply this device is no greater than for the "basket" or "cable grip" type.

the following conclusions regarding submarine cables can be drawn:

(1) That for long lengths and such conditions as prevail in San Francisco Bay, it is practically impossible to keep the lead sheath intact, and the water therefore works its way through the belt into the spacing surrounding the insulation of the individual conductors. In case of failure, the water also works into the copper strands of the conductor. The cables above mentioned are now being operated with water inside the strands and also inside the lead sheath, the rubber joints having been thoroughly vulcanized to exclude moisture from them.

(2) If it is possible to keep the lead sheath intact, thereby excluding moisture, it is better and cheaper to use paper insulation.

(3) If rubber insulation is to be used, the lead is not effective, nor does an insulating belt add to the dielectric strength, hence both lead sheath and insulating belt can be eliminated, depending entirely upon the rubber surrounding each conductor for the dielectric. The three insulated conductors may be covered with a taping or braid for mechanical protection only, the entire cable being served with steel protective armoring. Such cable will be lighter, cheaper and more easily laid, since it can be manufactured in longer lengths, and there would be fewer splices. In fact, it is not impossible that such cable could be laid in some cases without splices.

One of the Pacific Coast companies is now preparing for the installation of a 500,000-cir. mils, 3-conductor, 11-kv. submarine cable, with rubber insulation about each cable, but without lead sheath, the cable being protected by steel armor. Some of the dredger companies operating electric dredges in California have been for a number of years using 11,000-volt, 3-conductor submarine cable, rubber insulated and armored, but without lead sheath, and the service to which they are subjected is unusually severe.

The Use of Junction Boxes

It appears that most of the Pacific Coast companies are using side entrance junction boxes with entire satisfaction. One company has been using for the past twelve years, cast iron junction boxes of octagonal shape, which permit connections from eight different directions. These boxes, which are used for 220-volt a. c., 2,200-volt a. c. and 250-volt d. c. distribution, have proven thoroughly satisfactory for the service required of them. Their principal application is for 220-volt a. c. single phase connection to subway transformer secondaries, one of the boxes being installed in every transformer manhole. They are also installed in all manholes from which branch mains are fed or where load is taken off. Copper link

gested business districts, where loads are heavy and the space under the pavement is crowded with pipes, conduits, etc. It is in such locations that junction boxes perform their most important function and therefore must be of adequate dimensions to operate properly. At such locations it does not appear that anything is saved in attempting to keep the size of the manholes small.

For the protection of transformers in manholes there are a number of primary cutouts in use on the Pacific Coast. In the southern part of California, where pole transformers of considerable capacity are installed in large transformer vaults, under the street, the same type of cutout is used as on pole lines. In other parts of the state where subway transformers are used almost exclusively, we find two types of primary cutouts; one a cast iron box to which the cables are connected by means of brass nipples, the lead sheath being wiped to the joint. Protection is afforded by means of a small copper wire immersed in oil, which is arranged to blow only on a short circuit, and not on a moderate overload. This box has been manufactured and used by one of the Pacific Coast companies for the past twelve years, and has been quite satisfactory. The other type is the oil fused cutout, similar to the D. & W., which is safer to operate than the cast iron fuse box. For this reason, the former type is being largely replaced by the latter. It is believed that for subway use, the D. & W. oil cutout is thoroughly satisfactory.

Single vs. 3-Conductor Cable Terminals

At the point where underground cable risers connect to overhead lines, some form of terminal is necessary. Some of the Pacific Coast companies are using 3-conductor terminals and some 3 single conductors, or 3-phase lines. The preponderance of opinion is in favor of 3-conductor terminals up to and including 5000 volts, and single conductor terminals for all voltages above that. Some difficulty has been reported, due to failure in single conductor cables leading from the branch splice to the terminals, and also in the 3-conductor branch splice. We believe that the failures in the cable are due to the use of an improper type of cable on this service, as experience indicates that paper insulation will not stand the bending and handling which these single conductor tails are subject to; and it also appears that where these paper cables have been replaced with varnished cambric of the proper thickness of insulation, satisfactory service has resulted.

It appears further that failures in the 3-conductor branch splices have been due either to poor workmanship, poor materials, or both.

An analysis of the cable failures of one company, which about ten years ago changed from paper insulation to varnished cambric for the single conductor tails, and also used particular care in the making of the branch splices, reveals that this type of construction is no more subject to failure than any of the cables and joints installed underground.

Ventilation of Manholes

Power companies in Los Angeles are using large transformer vaults in the street, which they find it necessary to ventilate by means of motor driven blowers. One cold air and one hot air duct are provided in most cases, same running out to the sidewalk. It is necessary to keep these blowers in operation continually. These vaults are for the most part rather large; one in particular being noted, is 25 ft long, 9 ft. high and 9 ft. wide, built of brick with a concrete top. The total transformer capacity now installed is 925 kva., although spacing is provided for 450 kva. additional when needed. Transformers are grouped to supply 220-volt, 3-phase power and 110-220 single phase, 3-wire lighting, and in this case are all subway type. Ventilation is provided by means of two No. 1¼ "Sirocco" blowers, each directly connected to a ¼-hp., 230-volt, 3-phase, "special made" U. S. motor. These motors are especially designed for this service. The blowers operate on a 6-in. air line to the surface of the sidewalk. It appears that the companies operating these blowers have no trouble with them and that the reduction of temperature effected (from 10° to 15° C. on an average), thoroughly warrants the expense involved.

Some tests have been conducted by one of the companies in the northern part of the state to determine the effect of natural ventilation on smaller manholes. A 6 ft. by 7 ft. by 6 ft. 6 in. concrete manhole built in a paved street was equipped with a standard 36-in. cast iron circular cover, in which were drilled 113 ⅞-in. circular holes. When the solid cover was replaced with this perforated cover and the inner cover removed, thereby permitting the warm air to rise to the street, it was found that the temperature of the air in the manhole was reduced from 48° C. to 39° C., during which time there was a steady dissipation of 1980 watts of heat in the manhole. This condition was observed after the temperature of the air in the manhole had reached a steady value, which required about 14 days from the beginning of the test.

Another concrete manhole of the same size was ventilated by means of a 6-in. galvanized iron pipe, extended to the sidewalk about 6 ft. away and carried alongside a pole to an elevation of 8 ft. above the street grading. Cold air inlet was provided by means of a 12-in. circular opening in the street, entering the manhole about 12 in. from the floor. This opening was provided with a circular grating at the street surface. With a 2000-watt heater in the manhole, the natural ventilation due to the hot air rising through the 6-in. pipe and the cold air entering from the grating, kept the temperature of the air in the manhole down to a minimum of 30° C. In another concrete manhole of the same size, the warm air was permitted to escape from a grating 14 in. by 16 in. set in the sidewalk, cold air entering through a small grating and duct, in which case the temperature of the air in the manhole was reduced from 46° C. to 36° C., with 1960 watts dissipation.

The effect on the manhole temperature of plugging the duct between manholes is questionable. Some companies make it their practice to plug all ducts, others plug only those near substations or important manholes. No reliable information is available regarding the effect of any reduction of temperature, due to such ventilation.

Cheaper Underground Construction

A very effective and inexpensive type of underground construction is used by a number of Pacific Coast companies in residence districts or in the less important business districts, where sidewalk space is available. These installations consist of one or more pipes laid in a sidewalk space with small concrete pull boxes located at convenient intervals, usually from 150 to 200 ft. apart. The pipe is usually black wrought iron about 2 in. in size and is usually dipped in tar for preservation. In some cases the concrete pull boxes, which are about 18 in. by 24 in. inside diameter, are set flush with the sidewalk, and cast iron or sheet steel cover is screwed down securely in place. In other cases the surface of the pull boxes is left about 6 in. below the sidewalk of curb grade, the metal cover is laid back and the excavation filled in, the sidewalk being replaced as before, and the location being marked on the curb, so it can be readily found in case it is necessary to gain access to the box. Cables are spliced and wiped in these holes, all cable work being rendered watertight. This type of installation is common in all parts of the Pacific Coast, and experience indicates that it is thoroughly satisfactory for light loads, and where sidewalk space is available. The only cases where it has been necessary to open these boxes, is for additional services or additions in existing services.

The first cost of this type of installation is small, its maintenance is low and we believe it is well worthy of consideration in certain territories.

One of the companies in the southern part of California is using 2,300-volt, varnished cambric, non-leaded cable pulled in iron pipe to serve certain residence districts, comprised of large estates far apart. Service is supplied from pole type transformers located above ground in an inexpensive "vault" which consists merely of a section of large sewer pipe set in an inconspicuous space in the shrubbery. The secondaries consist generally of 2-conductor varnished cambric insulated and braided cables laid in black wrought iron pipe. Large tees with reducers are used for junction tap joints.

The use of lead covered cable suspended from poles in the same manner as the telephone company strings its aerial cable, offers one solution in the way of cheaper cable construction. This method is particularly applicable in the case where conditions are very unfavorable, and where such conditions might force power companies to go underground. There are a number of installations of this kind on the Pacific Coast, although the voltage in most cases is not above 5,000. Ordinary lead covered cable, either paper insulated or rubber, has been used, suspended from a steel messenger. The use of aerial power cable would not, however, overcome the aesthetic objection which so often forces lines underground. Hence this type of construction could only be used for certain special cases.

The Use of Larger Conduits

One of the Pacific Coast companies has installed several miles of 4-in. fibre conduit in the last year, the ducts being mostly 6-way, 2 ft. wide and 3 ft. high, and designed for 3-conductor, 11,000-volt cable, 500,000 cir. mils. Although the over-all diameter of this cable was such that it could have been pulled into a 3½-in. conduit, there are many advantages to the larger size duct. With 4-in. fibre conduit, the above 500,000 cir. mils cable can be readily pulled in lengths up to 450 ft., and the use of this size of conduit permits the installation of larger cables, at a later date, in case they become necessary.

There seems to be a decided preference among the operating companies for fibre conduit as against tile, particularly multiple tile, and most of the new work that is going in now is fibre conduit.

Choice and Maintenance of Apparatus to Meet Western Needs

Problems of Standardization of Equipment are Discussed From the Western Angle
by the Apparatus Committee of the Pacific Coast Electrical Association.

No-Voltage Release for Irrigation Plants Advocated

L. J. MOORE, Chairman *

It is becoming quite a standard practice at this time to install tertiary windings in all Y-Y station transformers. The purpose for which these windings are used are as follows:

1. To provide for a path for the flow of third harmonic current necessary for the production of the proper magnetization of the core for a sine wave of E.M.F. across the main windings. This also limits the third harmonic potentials to ground on the transformer and the connected transmission system.
2. To stabilize the neutral of the fundamental frequency voltages on the system and to provide sufficient flow of current in the line or windings at times of single phase short circuit conditions to give proper relay and circuit breaker operations.
3. To supply load for a small amount of distribution or for the operation of synchronous condensers.
4. To prevent inductive interference with telephone circuits which parallel the transmission system.

It is the purpose of this sub-committee to collect data as to the proper size of tertiaries to be installed in Y-Y transformer banks, to determine the best practice with reference to the grounding of neutrals on Y-Y banks provided with tertiaries, and to determine the best method of application of tertiaries to a system.

With reference to the proper size of tertiary to install in a given transformer bank, it is to be noted that purposes 1 and 2 above must both be considered. Simply to protect the transformer from third harmonic stresses under normal operation, especially with the neutrals isolated, the tertiary need only carry the third harmonic magnetizing current of the transformer bank. This current is never more than from 3 to 5% of the full load current of the transformer. Therefore, a tertiary for that purpose alone would not need to be greater than possibly 5% of the total capacity of the transformer. However, in cases of ground in the transmission system, conditions may arise where heavy currents will flow in the tertiary, and where it is desired to have such currents flow in order to properly operate relays and circuit breakers. On account of the fact that such disturbances must be removed from the system within a very short time, the length of time during which the tertiary winding must carry excessive current is not long, probably not over a few seconds. From three to four times full load current on the transformer should flow to obtain proper relay operation. A tertiary of about from 20 to 30% of the capacity of the main transformer will carry this current for the short time which it will be allowed to flow. This is general practice in selecting the capacity of tertiary to install, allowing sufficient reactance, so that not more than the three or four times normal current in the main winding is allowed to flow. It will be noted that a tertiary designed from this standpoint will be more than ample to carry the third harmonic currents which are present under normal operation, and it is seen, therefore, that a tertiary winding which will properly take care of short circuit conditions will also properly care for the third harmonic condition.

With reference to the grounding of neutrals on Y-Y transformer banks which are equipped with tertiaries, it is apparent that the practice and recommendations of both operating companies and manufacturers seem to be in very

close accord. Actual tests have indicated that the short circuit currents in tertiaries are very greatly reduced if the neutrals are grounded. The values with grounded neutrals are from half to one-third of what they would be if the neutrals were isolated. It is also impossible to obtain as excessive voltages across the windings if the neutrals are grounded, as would be the case with grounds on the transmission lines were the neutrals isolated. There seems to be no question but that the neutrals should be grounded in all cases.

In the study of the application of tertiaries to a system, the question arises as to whether a number of small tertiaries should be used, or, in other words, all transformer banks be equipped with tertiaries, or if the matter may be handled by the use of a few tertiaries of large capacity. In case the neutrals of the banks are grounded, tertiaries will tend to supply third harmonic currents for any banks which are not provided with tertiaries and they will in that event carry heavier currents under normal operation, than would be the case were the neutrals isolated. It is apparent, then, that a few small capacity tertiaries on a system might be in danger, yet it is also true that if all transformer banks were equipped with tertiaries, regardless of the size of the bank, there would be practically no danger of overloading any of the tertiaries, because each transformer bank would practically take care of itself, and there would be very little third harmonic current flowing in the line. The third harmonic potential to ground in a system, where the tertiaries are numerous and well scattered, might be lower than in one where there were few, and at widely distant points. Also, the removal of a small tertiary from a system, should the transformer bank be taken out for repairs, should not tend to increase the third harmonic potential to ground as much as the removal of a larger bank from the system.

The best practice appears to be to equip each Y-Y transformer bank with a tertiary proportioned as outlined above and to ground the neutrals wherever possible.

Standardizing of Distribution Transformers

Practically nothing of interest has come up in connection with the work along this line, except that the sub-committee of the National Apparatus Club suggested the elimination of 11,000-volt transformers as a preferred class, and of certain sizes of transformers in both 11,000 and 6,600-volt classes.

Objection was raised by the Pacific Coast companies to the elimination of 11,000-volt class as a preferred class, and to the elimination of any transformer sizes in the lines as now being manufactured. Inasmuch as the Pacific Coast companies use practically all of the 6,600-volt and 11,000-volt distribution transformers which are manufactured, it would appear that they should have some voice in the standardization of these lines. Objections were, therefore, raised to any changes in the present standards, with the result that the changes were not made by the National Committee, and the matter stands as it was.

Standardizing of Insulating Oils

The following memorandum on standardization of transformer oil which was sent out by the Transformer Sub-committee of the National Electrical Apparatus Committee of the N.E.L.A. offers the latest information on this subject:

*Apparatus Committee: L. J. Moore, chairman, W. R. Battey, G. H. Bragg, A. W. Copley, E. J. Crawford, P. O. Crawford, H. W. Dennis, R. H. Halpenny, G. Heinze, R. A. Hopkins, J. P. Jollyman, L. M. Klauber, J. A. Koontz, H. A. Laidlaw, I. H. Lecklider, W. P. L'Hommedien, S. J. Lisberger, R. S. Masson, H. Michener, J. Mini, R. F. Monges, E. Y. Porter, R. C. Powell, E. A. Quinn, Walter Smith, E. R. Stauffacher, E. E. Valk, F. M. Wentworth, G. M. Wills.

"The Transformer Sub-committee understands that the General Electric Company's Transil Oil No. 10 (refined from Eastern crude), or No. 10-c (refined from Western crude where the installation is in the Pacific Coast States), and the Westinghouse Company's "Wemco A" are standard and interchangeable on all constant potential distribution and power transformers whether for indoor or outdoor use, and in whatever climate.

"The two above named manufacturing companies agree that these two oils are interchangeable in their transformers and will not affect the guarantee.

"The next effort of the Sub-committee will be to make these oils acceptable to other manufacturers for use in their transformers and this campaign has already been started by letter. The Sub-committee will revise the pamphlet on the handling and testing of transformer oil and if the consent of the Association is obtained, will republish this for distribution at the Convention and thereafter."

Testing and Treatment of Transformer Oils

R. J. HALPENNY, Sub-chairman

Oil Treatment.—It appears that the recent adaptation of the De Laval separator to transformer oil purification will prove of great benefit, particularly where an oil containing an excessive amount of moisture or dirt must be handled, since the rapid absorption of water by the paper in a filter press or the clogging up of blotters by solid matter extracted from the oil, is a cause of much loss in time, and considerable expense as well. Tests would indicate, however, that the dielectric strength is not materially increased by passing the oil through the De Laval machine more than the once, also that the filter press can be used to increase the dielectric strength after the oil has been handled several times by the centrifugal separator. It would, therefore, appear that while the De Laval machine is of value where large quantities of transformer oil must be treated, it will not replace the filter press entirely and that best results would be obtained by the use of both.

Very little operating data is available, and it is probably unwise to draw definite conclusions from that submitted. It is hoped that the companies using both methods of treatment will be able to present more definite information at the convention of the association.

Oil Testing.—Apparently many companies have made use of the resistance control in the primary circuit of a testing transformer and have used a voltmeter across the primary for the determination of the secondary voltage, taking account of transformer ratio. In the testing of oil and other insulating materials this method has undoubtedly been the cause of erroneous conclusions since the distortion of the voltage wave and the resultant higher peak value could not be taken account of by voltmeter measurement.

If such methods of voltage are used, the actual test voltages on the high voltage side of the testing transformer should always be determined by spark gap measurements. Actual cases have been reported of voltages of anywhere from 10% to 40% more than in excess of that determined by transformer ratio with the volt meter connected to the primary side of the testing transformer.

Automatic Starters for Irrigation Pumping

E. J. CRAWFORD, Sub-chairman

The application of automatic starters to irrigating plants and city water supplies is a subject of increasing importance and one which is receiving careful attention.

The apparatus is far beyond the experimental stage and is in successful operation in many cases. It is of various design and can be adapted to the particular requirements of the apparatus to be controlled, and costs from 160% to 180% of the manually operated starters.

Where continuity of water delivery is of sufficient importance to warrant an additional expense in automatic apparatus, the money is well spent, as interruptions due to disturbance and voltage dips will be immediately overcome with appreciable interferences with the water supply. The central station and consumer should work out the problem independently for each case and the recommendation of automatic starters need be no reflection on the service rendered.

The Fresno City Water Company has 20 automatic starters in operation, many of which have been in successful operation over an extended period with very gratifying results. Several of the San Joaquin Light and Power Corporation's large agricultural consumers are seriously considering the installation of automatic starting apparatus, and it seems apparent that this class of starters may be installed to the mutual benefit of both company and consumer.

On account of the probability of leaky foot valves, it will undoubtedly be necessary to consider pumping through some small reservoir which will hold sufficient water to keep the pump primed until it is again brought into operation, but this will be a minor detail which can readily be worked out.

Reclosing Circuit Breakers and Automatic Substations

GEORGE M. WILLS, Sub-chairman

The Sub-committee on Reclosing Circuit Breakers and Automatic Substations has not been able to have a meeting of all the members of the committee. The work which has been accomplished has been through correspondence or personal interview with individual members. As far as we have been able to determine there is no well defined practice established in connection with this kind of equipment.

In a letter dated February 3rd, Mr. E. E. Valk of the General Electric Company, who is a member of our committee, states that his company has not published any literature on reclosing circuit breakers. However, he goes on to state that his company is developing three types of reclosing circuit breaker equipment. One mechanism, motor driven, is suitable for operating switches up to their K-36 size. Another development is a mechanism which will operate independently a number of breakers by means of a cam shaft. This is applicable to breakers of any size. The third development is an a. c. operating mechanism suitable for use up to their K-32 class. The above mechanisms are designated to follow the ordinary practice of reclosing after an ordinary time interval when circuits have been opened by an overload. If the breaker trips out again it will automatically be reclosed and after tripping out the third time in immediate succession, it will be locked open. The equipment is so arranged that the interval of time between the time of opening and reclosing can be arranged as desired.

We have from the Westinghouse Electric and Manufacturing Company some descriptive matter on automatic feeder panels which describes four schemes for reclosing circuits.

First is a scheme which they style as service restoring relay which is designed to reclose a circuit as fast as the mechanism can operate a predetermined number of times, which is ordinarily three, after which the circuit is locked open. The value of this method of operation is that synchronous equipment will not fall out of step provided trouble is cleared and service restored at once.

The second scheme provides for a periodic reclosing relay which provides for the reclosing of the circuit at predetermined intervals but not so fast that synchronous apparatus will have dropped out of step.

The third scheme is a combination of the first two and its operation depends on the character and severity of the short circuit on the feeder.

A fourth scheme provides for a periodic reclosing with selective action and is used when the auxiliary battery control circuit has not sufficient capacity to handle more than one circuit at a time.

The only equipment of this kind which has come to our attention outside of that manufactured by the two companies mentioned above is equipment now being designed by the San Joaquin Light and Power Corporation which is a motor operated mechanism, and acts in the same way as the fourth scheme suggested by the Westinghouse Company, except that it is motor operated instead of solenoid operated. Also the Southern California Edison Company have applied a system of weights to feeder switches which automatically reclose them once after they have tripped out from overload. It is evident, therefore, that the manufacturers do have some apparatus available for this class of work, and operating companies who are interested can easily obtain information by communicating with the manufacturing companies.

Eliminating the Waste in Industry

Shortcuts in Management and New Power Applications Which Have Been Adopted in Western Industrial Plants for Eliminating Waste, Increasing Production and Cutting the Cost of Manufacturing Processes

SAVING the waste in industry is today the most important problem which is facing American manufacturers, as evidenced by recent national and regional conferences on the imperfections of our industrial machine, participated in, not only by industrial leaders themselves, but also by the federal government. The wastes of employment during depression, from speculation and overproduction, from labor turnover, from conflicts, from failure of transportation of supplies of fuel and power, from excessive seasonal operation, from lack of standardization, from loss in processes and material—all combine to represent a huge deduction from goods and services which might otherwise be enjoyed if these imperfections could be ironed out.

In securing the services of Louis F. Leurey, one of the foremost industrial and electrical engineers in the West, to conduct a department devoted solely to eliminating the waste in western industrial plants, the Journal of Electricity and Western Industry feels that it is offering a helpful service to the manufacturers and industrial leaders of the West.

In each issue, Mr. Leurey will discuss in this department practices which have been successfully applied in one or more western industrial plants which have eliminated waste, increased production or reduced the cost of the manufacturing process.

These problems might be termed basic to all industries as distinguished from those which belong to one industry alone. The lumbering industry has its own problems as have the sugar and cement industries, but such is the bond of contact between individual members of each group that these problems find ready solution. On the other hand, the problems which are basic to all might be solved in one industry while members of the other continue to spend time and energy in seeking a solution. This department means to act as a point of contact between the members of all of these industries, giving to all the experiences of those individuals who have devised new methods of eliminating waste and increasing



LOUIS F. LEUREY

One of the foremost industrial electrical engineers in the West, who will conduct a department devoted to "Eliminating the Waste in Industry" beginning in the June 1 issue of the Journal of Electricity and Western Industry.

production. It is only through such interchange of ideas that progress can be made.

A word about the man under whose direction the department will be operated. Mr. Leurey is a graduate from the department of electrical engineering of Tulane University, Louisiana, with the class of 1902. For two years following he was connected with the testing department of the General Electric Company. In 1904 he joined the engineering staff of Sanderson and Porter of New York and until 1912 was construction engineer of power developments which took him from New Orleans to British Columbia. He joined the British Columbia Electric Railway Company, Ltd., in 1912 as electrical engineer in charge of the reorganization of the Victoria receiving and distribution system. From 1914 to 1916 he was assistant chief mechanical and electrical engineer for the Panama-Pacific International Exposition in direct charge of all field installation and operations. In 1917, Mr. Leurey opened an office as consulting engineer in San Francisco and

since that time has prepared plans and reports and supervised the installation of extensive mechanical and electrical equipment for such representative concerns as the Hutchinson Lumber Company of Oroville, California, whose plant is entirely electrically operated, the California and Hawaiian Sugar Refining Corporation, the Sperry Flour Company, which has seven mills in California, Utah and Washington, the National Carbon Company, the Old Mission Portland Cement Company, the Kroyer Tractor Company, the New Cornelia Copper Company, Ajo, Arizona, the Pacific Coast Steel Company, the Liberty Shipyards, the Modesto-Turlock Irrigation District, the Union Sugar Company, the Signal Supply Company and the Mountain Copper Company.

It is hoped that this department will also serve as a clearing house for executives and officials of industries themselves, affording them an opportunity to place before their fellows the methods which they have devised to combat waste. Toward this end, the department is always open to contributions from its readers.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Efficacy of the Electrical Play is Demonstrated

Oregon Contractor-Dealers Devise New Method of Putting the Convenience Outlet Story Before the Public

By R. G. EMERSON

Field Representative, Northwest Electrical Service League

Probably there has been no single voice which has done more to carry the message of "Do it electrically in the home" than has the "home electrical" program. And yet, even before this great movement has gained the momentum which will undoubtedly cause it to sweep all over the country, there comes a second and perhaps no less powerful agent for the electrical idea, which has been called "Electrical Domestic Comfort."

Who originally conceived the idea, or here the first presentation of the play was attempted, the writer is unable to state, and that, at the present time, is unimportant. It is enough to understand the nature of this new project and to contemplate the valuable possibilities of the idea. Just as the "home electrical" is an intensely powerful force in promulgating the advantages of using "electrical domestic servants" in the modern home and the importance of having the home adequately wired to permit the use of these servants with convenience, the "electrical play" should prove to be a potent salesman to bring this idea forcibly before the home builders of America.

A concrete example is always of good value. At the eleventh convention of the Oregon Association of Electrical Contractors and Dealers, held in Corvallis, Oregon, recently, there was presented a four-act playlet, called "Electrical Domestic Comfort." Three performances were given at which there was an estimated attendance of over 600 architects, building contractors and others interested in new or reconstructed homes, or approximately ten per cent of the community's population.

This selected audience was shown, by means of a dramatic portrayal of the day's activities in a modern electrically-

equipped home, the various ways in which the housewife's burdens are alleviated and the comfort of the various members of the family enhanced. Not only did the plot demonstrate the operation of the many appliances but it also clearly illustrated the proper methods of illuminating the various rooms in the home, the importance of striving for lighting effects rather than merely for the selection of beautiful fixtures.

The play's four acts, in which students of the dramatic classes of the Oregon Agricultural College played the parts of members of the family, showed in succession the bed room, combination kitchen and laundry, dining room and sitting room. By an ingenious arrangement of curtains and partitions the transition from one scene to another was accomplished without any interruption of the plot sequence.

First was shown the bed room and the manner in which various equipment, such as warming pad, toilet accessories, night lamp, and auxiliary heater, are used to add to the comfort and convenience of living in a properly electrified home.

Without the delay usual to theatrical productions the scene was shifted to the kitchen where preparation of the morning meal, the washing and ironing of the week's laundry, and other activities of the housewife's daily program were depicted.

Following this act the audience was shown the dining room with the evening meal in progress.

The final scene showed the members of the family congregated in the living room, reading by the light from the floor lamps, playing the electrically operated piano or victrola, and warmed by an electric fire log. Some neighbors who visited expressed their envy of the

excellent illumination of the room and were told in enthusiastic exclamations from the housewife how much her electrical equipment meant for the comfort of herself and the other members of the family. This scene was featured by a display of color-blends, made possible by the use of a battery of dimmers behind the scenes. The impression left with the audience was one of appreciation of the ease and convenience made possible for each member of the family by a properly electrified home.

Special emphasis was naturally given to the location of an adequate number of convenience outlets in every room, so that each appliance and fixture could be used to the fullest advantage. The plot as presented, therefore, and doubtless as it will be after reconstruction for further presentation, stressed in particular three main points—the advantages of using electrical appliances, the importance of careful consideration of the illuminating of each room, and the necessity of having conveniently located appliance and fixture outlets in every room.

"Electrical Domestic Comfort," which it is hoped is merely the beginning of a program of similar plays in the Pacific Northwest, impressed the members of the association and visiting electrical men with the possibilities in this form of exhibit. Among those who should receive due credit for the conception of the idea and the production of this initial performance are Francis H. Murphy, illuminating engineer of the Portland Railway, Light and Power Company, J. Frank Barrett, Portland electrical dealer, Frank R. Whittlesey, secretary of the association, Donald Bruce Stuart, superintendent of light and power at the Oregon Agricultural College, and the contractor-dealers of Corvallis, Cummings, Cole and Clark, who worked hard to make the playlet a success. Probably the electrical industry is indebted to these men for a new development in the constantly widening program to educate the public regarding the advantages of "doing it electrically" in the modern home.



The kitchen in "Electrical Domestic Comfort," the playlet given at the convention of the Oregon Contractors and Dealers, was a model for a properly equipped room.

The many electrical conveniences for the living room were demonstrated by the students of the Oregon Agricultural College, who presented the four-act play.



The new San Francisco office of Moe-Bridges Company, "The Fixturesmiths," has developed the wholesale merchandising of fixtures and glassware to a high degree of perfection. With 18,000 sq. ft. of floor space, part of which is devoted to display alone, there is still room in the establishment for storing approximately fifty carloads of material, enabling them to fill any order from stock.



One of the three fixture display rooms devoted to residential fixtures. Individual switches operate any desired set. In the rear is the display room devoted to commercial fixtures and glassware.



The general office shows the effectiveness of simplicity in arrangement. The display rooms open from the rear while above can be seen the spacious mezzanine floor which will be devoted to the display of lamps of every conceivable type.

Western Factory Branch Applies Modern Merchandising to Fixtures

Moe-Bridges Company's San Francisco Office Incorporates Many Novel Features for Proper Display of Fixtures

MERCHANDISING lighting fixtures, at least from the angle of proper display, has been perfected by the Moe-Bridges Company. The Fixturesmiths of Milwaukee, in that company's new western branch in San Francisco. This branch distributes to dealers in California, Oregon, Washington, western Idaho and western Nevada and has on display every type of fixture manufactured by the company.

The new branch consists of a main office, three display rooms for fixtures, one for glassware, a mezzanine floor for lamps and a basement for storage, in all, 18,000 sq. ft. of space. In the office and display rooms simplicity has been the keynote of the scheme of arrangement. There has been no attempt to crowd the entire stock into the front office. There are less than a dozen of the most attractive types in this room. It is in the display rooms in the rear where the stock is effectively displayed. These rooms are so arranged that they may be partially darkened and any one set of fixtures illuminated from a central switchboard. Wall brackets are hung from the walls.

One display room is devoted to commercial lighting units and glassware. An ingenious scheme is used in displaying the latter. The globes are displayed on shelves which are set at an angle with the wall. Circular holes are cut in the shelves, and a powerful lamp and reflector attached to the under side so that any one piece may be displayed properly.

The entire mezzanine floor with the exception of one room will be devoted to portable lamps of every type. The small room will be devoted to a shop for the re-finishing of lamps and globes where special home decorative schemes demand special color effects. The room contains electrically operated paint sprays and special drying racks.

The stock is so stored in the basement that fifty carloads of fixtures may be kept on hand at all times. Special shipping and packing tables have been constructed to handle orders of any size from stock.

This western branch marks a new departure in the practice of the jobber or factory representative, for the company is applying the same modern merchandising methods to the dealer as the dealer applies to his own customers.

Recording Electrical Sales by Means of Charts

A Discussion of the System Used in a Southern California Contractor-Dealer Store and Its Many Advantages

By D. D. McFARLANE

Sales Manager, Newbery Electric Corporation, Los Angeles

Some companies feel that the expense of collecting data and the time expended in making charts is too great for the results obtained, but we have found that by having our accounting system arranged in a manner proper to produce a true and correct financial statement, we have the necessary data on hand at all times to keep up our charts.

This is done by listing all sales into proper classifications as to departments and then subdividing into kinds of merchandise sold.

For example our sales are listed under four departments—construction, fixtures, repairs and store sales—the total of these give us the figures for a chart which shows at a glance the rise and fall of our sales from month to month over a period of years and indicates the growth of the business one year over the other. It shows the peak seasons which will be noted each year in October, November and December and the falling off in January.

The results of a study of this total chart shows when to place your orders to protect oneself for the rush seasons and when to cut down so as to keep the stock in a condition to insure quick turnover.

The scale on the left hand side can represent any amount in dollars in tens, hundreds, or thousands, according to the size of the chart sheet and volume of business. The number of years on one chart naturally depends on the length of the sheet and the vertical ruling. In the sample shown we show three years but on the one we use we carry it for five years on the one chart.

best, another may find the summer months the best. This is true in a marked degree in respect to the store trade and the contracting department, the store department receiving the Christmas gift trade while the contracting department is heavy in the summer months when building is at its peak.

The store sales department also subdivides its sales under the following



Chart showing the total volume of business by months over a period of three years, showing the peak seasons in November and December. The figures on the right can be used to indicate the volume of business in any unit, depending upon the size of the store.

headings and carries a chart for each—wiring supplies, washing machines, vacuum cleaners, sewing machines, socket appliances, mazda lamps, and ironing machines. Under wiring supplies are grouped sockets, bells, batteries, switches, etc., and under socket appliances are grouped percolators, toasters, grills, irons, fans, and all appliances with a cord and plug attached ready for immediate use.

By watching each of these charts we are able to plan our advertising on each line as the demand seems to follow somewhere close to the same rise and fall each year during the same months, which would prove that the public buys electrical goods to a certain extent in a seasonable manner. This the writer has found to be true to a much more marked degree in the East and Middle West where the seasons are more separate and distinct.

While the total sales chart is very interesting to the general management as it shows the general trend of business, it is not watched with as much interest by the sales force as the charts showing the separate classifications, as these show a comparison of sales on a particular line of goods for each year by months. It will be noted that the same chart is used for several years, done by using a different colored line for each year. This gives us at a glance the relative amount of sales in any particular classification of goods one year over another, also the best season for pushing the line.

By having each classification on a separate chart we are able to determine the quality of stock to carry in each line to assure the proper turnover. This important feature is quite often overlooked when there is no separate classification and work only from memory

or base the stock on general turnover.

The scale on these charts can be planned as on the main chart, according to tens, hundreds, or thousands, according to the volume of business transacted in each classification.

Another chart that we have found very valuable is the one showing the total sales of each sales person by months. This is carried on our chart by using a different color or line for each sales person in the form of a thermometer. By a glance at this you can see the rise and fall of their sales, also, the relative value of each as a producer of sales.

This we found sometimes misleading, until we started a chart showing the number of customers served by each sales person. We found some cases where a clerk's sales would be below the average or show less than another clerk drawing the same salary, but upon checking the number of sales we would find that they had been really serving the greatest number of customers, but had been selling only the small items. In one case we found that one clerk whose sales showed a decline, had served almost twice as many customers as any of the other clerks. Having these facts not only cleared our wrong impression to her value, but also caused us to change our floor plan so that the class of sales would be more evenly divided.

The chart we have found creating the most interest among the entire sales force, is a large map of the city that we have on the wall showing each large appliance sold and its location.

This is done by using different colored tacks for each large appliance, such as washers, ironers, dish washers, vacuum cleaners, and sewing machines, and having each salesman put up the proper colored tack as soon as the sale is completed.

WASHING MACHINES

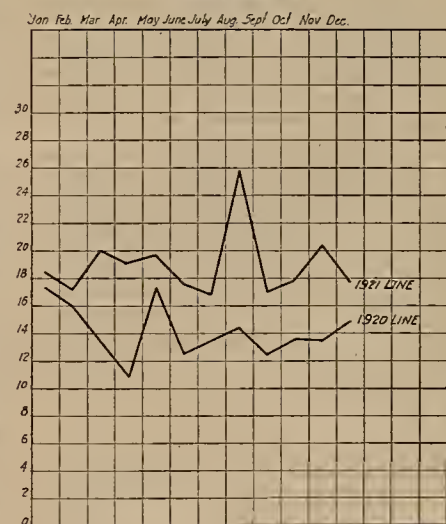


Chart showing the sale of washing machines for two separate years. On the 1921 line note the high total in August, when an intensive campaign was staged.

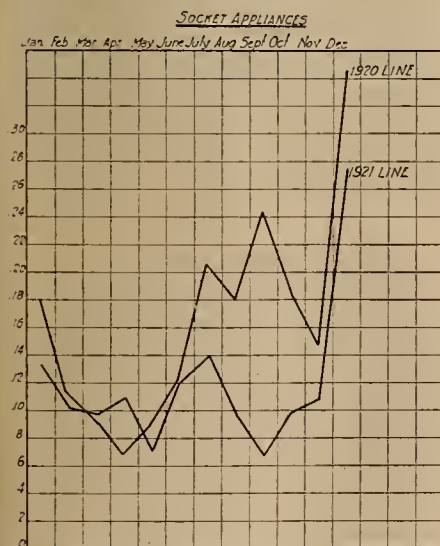


Chart showing the sale of socket appliances for two years, together with the period of greatest activity. The lines representing the year's business are in different colored inks.

The total business of each department is then carried on a separate chart which shows the total business by months and gives the department heads a true idea of when they should expect the most business in their departments, for while one department may find the Christmas trade to be their

Regarding the time used in keeping up these charts, I would estimate that we spend 30 minutes each month putting the lines on the charts and a minute or so for each tack put on the map, but considering the assistance they have given us in return, we consider it time very well spent.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

New Radio Company Formed

Million Dollar Firm in Salt Lake City Will Manufacture Receiving Sets

A million dollar corporation has just been organized in Salt Lake City, and a factory site purchased at Holliday, a suburb, for the manufacture of the Baldwin radio receiving sets on a large scale. Nearly 100 prominent business men of Utah are interested in the corporation, which will be headed by David A. Smith, Lester D. Freed and Joseph F. Nibley.

For several years Nathaniel Baldwin, inventor, has manufactured, at 3474 So. Twenty-third East St., the Baldwin mica diaphragm telephones which are declared by experts to be the nearest to perfection of any electro-magnetic radio receivers in existence. With the development of the radio telephone and its sudden spread over the country, there developed a demand for these sensitive receivers which the factory has been unable to meet, due to limited capacity. The capacity of the new plant will be between 1,000 and 3,000 receivers per day from the beginning, and the prediction is made that Salt Lake City will shortly be in a position to supply a large part of the world demand for these instruments.

Mr. Baldwin holds the basic patents, to not only the instrument, but to the machinery which he has created for its manufacture.

After thorough tests by the United States Department of Mines, the Baldwin receiver has been declared to be eight times as sensitive to radio waves as the nearest competitor.

The present plans of the new corporation include the immediate construction of the first unit of its manufacturing plant, which is expected to develop into one of the largest industries in the West. Every share of stock in the new corporation has been subscribed for by Utah people.

Mr. Baldwin has been employing about 130 men. It is expected that more than 2,000 men will be on the payroll in the near future.

Government Plans Timber Sale in Grays Harbor District

Details of the content and sale requirements of the big Crook Creek timber unit, in Grays Harbor county, Wash., placed on sale to the highest bidder by the Department of Indian Affairs, have been announced. The big tract contains 11,300 acres with a stand of approximately 305,000,000 feet. The stand includes about 56,000,000 feet of cedar, 69,000,000 feet of spruce, 100,000,000 feet of Douglas fir, 79,000,000 feet of hemlock, 2,000,000 feet of white pine, 550,000 lineal feet of cedar poles, and an unestimated amount of fir piling.

No bid will be considered if it quotes prices less than \$2.50 a thousand feet for live and dead Douglas fir, spruce and cedar, \$1.50 for white pine, 60 cents for hemlock and other species, one-half to one and one-half cents per lineal foot for cedar poles, and one-half cent per lineal foot for fir piling. At least 10,000,000 feet must be cut from this tract before April 1, 1925, and at least 25,000,000 feet must be cut and removed each year thereafter.

S. F. Steel Company Branch Plant in Seattle

The Western Pipe and Steel Company of San Francisco has leased a portion of the Patterson-McDonald shipyards on the Dumawish Waterway in Seattle for the establishment of a steel plant where approximately 250 men will be employed. The plant will manufacture the steel pipe which Grant Smith and Company will install in the 16-mile Swan Lake pipe line for the city of Seattle.

In leasing the plant, the company has obtained an option on this portion of the shipyards with a view of purchasing it for the permanent location of a steel plant upon the completion of the Swan Lake job. H. C. Tellerday, general manager of the steel company, has announced that an initial investment of \$150,000 will be required for the purchase and installation of the machinery needed in making the pipe.

Railroad Will Build \$2,000,000 Repair Shops in Denver

Denver will become the center of operations in the West for the Chicago, Burlington and Quincy Railroad as the result of the announcement by that road that work is to begin immediately upon the construction of general shops which are estimated to cost more than \$2,000,000. Plans for the buildings were destroyed in the recent fire at the general offices of the road in Chicago, but it is understood that new plans will be ready shortly after May first.

The new shops will not only serve the western branches of the B. B. & Q. but will also serve the Colorado and Southern lines, a subsidiary. They will be erected on 160 acres of land at Utah Junction adjoining the shops of the Moffat road. The building of the shops is the greatest constructional undertaking in this section this year.

Approximately 1,000 men will be employed in the shops as soon as they are completed. At the same time the announcement was made regarding the new shops, it was reported that 125 all-steel passenger coaches and 1,000 new coal cars have been ordered for the Colorado and Southern lines.

Power Project for San Diego

\$6,000,000 Will Be Spent by Railroad and Water Company on Development

San Diego County is to have more than \$6,000,000 expended in the development of a water and power project on the San Luis Rey River as a result of the combined efforts of the San Diego County Water Company and the Santa Fe railway.

At the site of the Warner ranch the first of a series of dams will be constructed, and the contract has been awarded to Bent Bros., Los Angeles contractors. This work is now under way. Two other dams will be built on the San Dieguito River. According to the plans prepared under the joint supervision of J. B. Lippincott, also of Los Angeles, and H. Hawgood and R. C. Starr, there will be an ample supply of water for the city of San Diego and also for the irrigation of 50,000 acres which the project company proposes to develop. No announcement of the amount of hydroelectric power to be developed has been made.

John Treanor, vice-president of the water company, who is also vice-president and general manager of the Riverside Portland Cement Company, in announcing the details of the project, gave the Santa Fe railway much of the credit for the forward policy and assistance in financing which will mean so much in the future progress of the extreme Southwest, as a direct result of this extensive improvement. William G. Henshaw of San Francisco is president of the San Diego County Water Company, as well as of the Riverside Portland Cement Company.

Portland Power Company to Survey Power Possibilities

Detailed surveys will be undertaken in the near future, by the Northwestern Electric Company of Portland, of the hydroelectric possibilities of the Klickitat, White Salmon and Lewis rivers in Washington, to determine which is the most feasible of economical development. The next hydroelectric development of this company will be based upon these surveys, and will be undertaken as soon as the demand for additional generating facilities makes it necessary.

Herbert Fleishhacker, of San Francisco, president of the company, after a trip of inspection over the company's properties, states that he believes the rapid growth of the community served by it and the rapid growth and recovery of the Northwest to normal will make the development of another hydroelectric project necessary in the immediate future.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry

While the introduction of bills by Senator Johnson, of California, and Representative Swing, of the Eleventh California Congressional District, to regulate and utilize the waters of the Colorado River, has aroused wide interest, the general opinion on Capitol Hill is that there is little chance for the passage of these measures. The bills are identical and were introduced simultaneously in the Senate and in the House. Just at this time a measure authorizing the expenditure of \$70,000,000 is not going to be looked upon with favor by the steering committees and by the floor leaders. In addition to that, however, it is not likely that serious consideration will be given to any legislation looking to the utilization of the Colorado River prior to the receipt by Congress of the recommendations of the Colorado River Commission. It is known that no administration support can be mustered for any measure prior to the Commission's recommendations. Since Secretary Hoover is the chairman of the Colorado River Commission, it is probable that administration support will be reserved for the measure which will translate the Colorado River Commission's recommendations into legislation.

That Congress will not take action on any bill which anticipates the results of the Commission's study of the situation is assured further because Congress itself approved this procedure. Each of the states directly interested in the Colorado is represented on the Colorado River Commission. The Commission has held extensive public hearings and is now engaged in digesting the testimony which it took in the Southwest. Hearings are to be reopened August 1. It hardly is probable that recommendations can be submitted before the first of the year. The intricacies of the situation are such and the desires of the various states so conflicting, that a great deal of hard work and considerable time will be required before the Commission's recommendations may be expected.

Mining Law Revision

Active work looking to the revision of the mining laws has been begun. The Committee on Mines and Mining of the House of Representatives expects to continue its hearings on this subject periodically. There is no inclination to hurry the revision. It is realized that nothing can be gained by attempting to jam through legislation on this subject. It took ten years to secure the enactment of the oil and leasing act. While it is not anticipated that as great a length of time will be required in this instance, it is realized that the changes proposed in the mining laws are fundamental and are entirely comparable to the change made in the laws governing the exploitation of petroleum deposits. At the initial hearing on the subject, H. Foster Bain, the director of the U. S. Bureau of Mines, recalled the intense opposition to the oil land leasing act, but expressed the opinion that not more than one per cent of those who formerly were opposed to the passage of that bill

now would favor the return to the old system.

The more important changes in the existing mining law are the following: Abolition of the apex law and the substitution of vertical side-lines for mining claims; abolishment of the requirement of discovery prior to location; limiting the time a claim owner may hold a claim without patenting it; increasing the requirements as to marking claims and making it compulsory that they be recorded in the District Land Office; permitting the payment in cash in lieu of assessment work; permitting acquirement of surface rights needed for mill sites and other mining purposes.

Director Bain has acquainted the committee with his belief that the proposed abolition of extra-lateral rights to mining claims located hereafter "will do much to stimulate development by removing a serious danger of litigation and that such legislation will have the support of the best opinion and of the large majority of those interested in such development."

Federal Injunctions

For the past several weeks active efforts have been in progress in favor of a bill, introduced by Representative Bachrach, of New Jersey, which would take away from the Federal courts the right to issue injunctions against decisions handed down by state or municipal public utility commissions. The proponents of the bill are arguing before the judiciary committee of the House of Representatives that the Federal injunctions are nullifying many of the orders of the utilities commissions. On the other hand, those opposed to the bill declare the abolition of the right to go before a Federal court, when a rate order does not permit a fair return on a public utility property, would have the effect of discouraging investments from other states in public utilities.

Gold and Silver Institute

The American Gold and Silver Institute, with headquarters in the national capital, began to function May 1. H. N. Lawrie is the managing director of the organization. The Institute will engage in statistical research and economic surveys which are to be used as a basis for national legislation, and for administrative regulations promulgated in connection with laws having a bearing on transportation and taxation. In addition it expects to assist in fighting the battles of the gold and silver producers.

Highway Bill Passes

The highway bill came before the House of Representatives on May 2 and was passed overwhelmingly by a vote of 239 to 31. It authorizes the appropriation of \$65,000,000 as the Federal Government's share in highway construction during the fiscal year to end June 30, 1923, and \$75,000,000 for the fiscal year to end June 30, 1924. In addition the bill carries \$6,500,000 for forest roads.

Since the legislatures of thirty-four states meet next January and do not

meet again until 1925, there is great insistence on the part of many states that the Federal Government outline a three-year program so as to enable the legislatures to make their appropriations far enough in advance so as to give time to take up further appropriations at the 1925 session. A very determined effort will be made in the Senate to amend the bill so as to provide \$75,000,000 for each year during the three-year period.

S. F. Electrical League Condemns Water and Power Act

The proposed California Water and Power Act has been condemned as a bureaucratic revival of the spoils system in a resolution unanimously adopted at a recent meeting of the San Francisco Electrical Development League. The resolution was presented by Garnett Young, chairman of the public relations committee. Copies have been sent to all civic and commercial organizations in San Francisco.

The resolution follows:

"Be it resolved by the San Francisco Electrical Development League as follows:

The proposed constitutional amendment, known as the water and power act, will be on the ballot as an initiative measure for approval or rejection by the people at the election in November, ought to be defeated for the following among other, reasons:

"(1) It provides for a wholly unnecessary and disturbing change in an industry, which, under California's policy of regulation, has served and is serving the public well, supplying an abundance of power at the lowest rates prevailing in the United States, and with ample provision for necessary future development.

"(2) It is designed to break down California's established and successful policy of regulation by the railroad commission under the public utilities act, which secures to the public fair rates, power at cost, sound financing and adequate service.

"(3) It embodies wrong political and economic principles, would establish an intolerable bureaucracy founded on the spoils system, and would be a long stride in the direction of the socialistic ideal of the nationalization of industry.

"(4) It would work injustice to thousands of persons who have invested in the securities of California public utility companies upon their confidence that the state of California would adhere to its successful policy of regulated monopoly as against destructive competition in public utility service which results inevitably in the ruin of the competitors and higher charges to ratepayers.

"(5) It would bring about a cessation of the steady hydroelectric development which is essential to the continued industrial growth of California.

"(6) It would impose upon the industry and property of California a tax liability that would invite disaster.

"The San Francisco Electrical Development League therefore calls upon its members and voters of California to oppose the water and power act."

L. A. Company Solves Gas Storage and Transportation Problem

Transportation problems are of consuming interest in all sections of the West. Fuel transportation by pipe lines is not new. The principal difficulty is to successfully equate the available supply to the users' demand. Geographically, and with respect to time, these factors do not coincide. Therefore transportation and storage are, at once, of chief interest in the growing centers of industry and population.

To meet the demands of a rapidly increasing consumption the companies of Southern California are constantly reaching into distant natural gas fields for their supply. Large quantities are pumped from 50 to 100 miles in connecting the supply with the principal



This high-pressure gas holder has a capacity of 107,000 cu. ft. and was erected 35 miles from the source of supply. It is part of the system of the Southern Counties Gas Company.

points of consumption. Fuel gas, equivalent to 100,000 tons of coal, was used in the vicinity of Los Angeles during the year 1921. This represents an increase of 1,000 per cent during the last ten years.

As a distinctly new and revolutionary method of equating the supply and demand, two engineers of the Southern Counties Gas Company, M. R. Thompson and A. F. Bridge, have designed and supervised the erection of a high-pressure storage system which has successfully demonstrated its value during the coldest weather of last January. This high-pressure gas holder, with a capacity of 107,000 cu. ft. when filled, was erected in the Azusa-Glendora district of Los Angeles County, which is 35 miles from the source of gas supply in the Placentia oil fields of Orange County.

In all this territory the periods of heavy consumption are identical, and consequently the demand put upon the transmission line is very heavy during the "peak" periods. The new storage tank fills itself automatically during the light load period when the pressures are highest due to low consumption, and stores this gas until the later heavy demands require more gas than the transmission line can supply.

The Azusa storage tank is 35 ft. in diameter and 72 ft. in height. The tank has no moving parts, and consists of an air-tight chamber at the bottom

with a superimposed water tank on top. When the lower tank is filled with gas, the water is forced into the top section and in emptying the reverse action takes place. Ordinary pressure regulators are employed to shut off the supply when the holder is full.

The high pressure carried in the gas chamber necessitates rather heavy construction, but by an ingeniously designed system of stay-bolts, the weight of metal is cut down to a surprisingly low figure and the cost of a completed holder is less than that of a low pressure holder of equivalent capacity.

With low first cost, no moving parts to require maintenance, no boosting machinery and no operating labor necessary, it is very apparent that as high-pressure distribution of gas becomes more and more the inevitable solution of gas companies, this new method of storing and maintaining adequate gas supply will receive general adoption by the gas industry.

Supreme Court Overrules Special Contract Appeal in Utah

The United States Supreme Court has dismissed the appeal of several customers of the Utah Power and Light Company in the famous "special contract" case which was decided by the public utilities commission of Utah, later upheld by the Supreme Court of Utah, and finally carried to the United States tribunal.

Contracts of fifty-five of the company's customers were set aside by the Utah commission, due to the fact that these contracts carried preferential and discriminatory rates, and were ordered placed on standard schedules.

It was contended by these customers that their contracts for electric service were protected by the federal constitution and were made prior to the creation of the public utilities commission, and that the decision of the Utah Supreme Court sustaining orders of the commission, setting aside these contracts on the ground that they were preferential should be reversed. The commission asserted that the contracts could be properly terminated, and these consumers placed on schedules which were not discriminatory and preferential, in accordance with the provisions of the public utilities act of the state of Utah.

Mountain States Power Company to Improve Transmission Lines

Extensive improvements both to transmission lines and other properties will be undertaken by the Mountain States Power Company of Albany, Oregon, in the near future. The improvements consist of a new brick office building at Corvallis, an 11,000-volt transmission line from Springfield to Cottage Grove, a 66,000-volt line from Albany to Independence, Dallas and Monmouth. The company has recently purchased the properties of the Cottage Grove Power Company, consisting of a steam plant, which will be dispensed with. The new transmission lines will connect with those of the California Oregon Power Company which are being built from that company's hydroelectric plant on the Rogue River to Eugene. All of the work is to be completed this summer.

Pacific Power and Light Co. Stages Road Show in Northwest

The Pacific Power and Light Company of Portland, Oregon, has recently completed a series of road shows which have been put on with great success in the various communities which the company serves. In four cities, a total of 2,810 people attended eight performances of the show. Two performances were given in The Dalles and Hood River, Oregon, and White Salmon and Toppenish, Washington.

The show consisted of a series of colored lantern slides showing views of the

FREE MOVIE!

Are you interested in your local Power & Light Co.?
If so do not fail to see this performance.

PROGRAM INCLUDES

Two Reels of Motion Pictures Featuring

"BACK OF THE BUTTON"

LANTERN SLIDES SHOWING

"The Character of Territory Served,"

"Modern Electrical Construction,"

"Heavy Construction,"

"Safety First,"

"Always at Your Service."

Slides are accompanied by a talk by Mr. L. A. McArthur, General Manager, Pacific Power and Light Company

LOIS THEATER

TUESDAY, APRIL 4, 1922

Admission Free

Two Shows 4 p. m. and 8 p. m.

A sample of the advertising used in papers in the various communities where the Pacific Power and Light Company's show was staged.

company's property and hydroelectric plants. The slides were accompanied by a lecture by Lewis A. McArthur, general manager of the company. In each of the cities Mr. McArthur was introduced by the local manager for the power company. Following the showing of the slides and the lecture, the motion picture film "Back of the Button," which has been produced under the direction of the National Electric Light Association, was shown.

The type of show was varied at each performance, with special prominence being given to power company property in that locality and to local industries operated electrically. At the afternoon performances, which were largely attended by children, only the more elementary slides were shown, and the General Electric film, showing the development of illumination, was substituted. Immediately after each show there was a prize drawing, an electric iron being given to the woman holding the lucky ticket.

All of the performances were free and each was extensively advertised, not only in the newspapers of each district but also with handbills which were distributed before the show reached each city.

Officials of the power company state that the good will accruing from the show has already made itself felt.

Successful tests in receiving radio telephone messages on a moving train were recently made by R. C. Denny of the San Joaquin Light and Power Corporation of Fresno, California. The tests were made in conjunction with a trip through the interior valleys of California, participated in by a delegation from the Oakland Chamber of Commerce.

Railroad Commission Lowers Power Company Rates

Southern California Edison Company and San Joaquin Light and Power Corporation Affected by New Rulings

Reductions in rates ranging from 8 to 12 per cent in the case of the Southern California Edison Company, and from 5 to 7 per cent in the case of the San Joaquin Light and Power Company, have been granted by the California State Railroad Commission. Both reductions are effective on all meter readings after May 1.

In the decision governing the California Edison Company, the reductions are to take the form of discounts as follows:

Street railway service, 8 per cent.

Street lighting, power and resale, 10 per cent.

General lighting, 12 per cent.

The reductions will not apply to minimum charges. In the decision, the Commission points out that the discount was levied as an emergency measure. Owing to the emergency character of the order the commission reserved for a future proceeding, full consideration of fundamental issues of rate base, rate of return, depreciation allowance and allowance for taxes. The commission adopted a rate base of \$102,560,000 as against the company claim of \$105,827,699.50, and estimated that on this basis the return of 8.3 per cent allowed in a former decision, would give the company an income of \$8,512,480. It is estimated that the saving to consumers is approximately \$1,609,520.

In the case of the San Joaquin Light and Power Corporation, the decision of the commission is based on a complete valuation of the company's operating properties, following field surveys and hearings lasting several months. The principal reductions are:

Domestic and commercial service, from 9 cents for the first 20 kw-hr. to 8 cents for the first 30 kw-hr.

Industrial power, approximately 5 per cent.

Street Lighting, 6 per cent.

Agricultural rate, on an average of 6 to 7 per cent. The demand charge is reduced \$1 per hp. a year and the minimum charge is cut to \$3 per hp. a year. In order to reduce the burden upon agricultural consumers the annual demand charge and minimum bill are made payable in eight monthly installments.

The rate in the oil fields is continued as now in effect.

The opinion handed down by the commission contains a number of ruling on fundamental questions related to regulation.

The "present value" theory as a basis for rate-making was rejected. This theory applies present day costs to the system as a whole, irrespective of date of construction and then depreciates the properties according to present condition.

A claim of "cost to produce" the business of the company was not allowed. This claim was based upon an estimated deficit over a period of years, below a return equal to the cost of money plus 1½ per cent. This so-called development cost amounted to \$1,952,000.

Water right values, set up by the company amounting to \$1,743,000, were also excluded for rate purposes.

Federal income taxes were declared not to be a property charge under operating account. The effect of this ruling is that the stockholders and not the rate payers, must pay these taxes.

An arbitrary percentage return over the cost of money to the company was not given sanction.

Will Celebrate Electrical Week in Everett, Wash.

Plans for the Electric Week to be held in Everett, Washington, May 20-28, have been completed, and include the installation of an "Electric Home," said to be the first installation of the kind in the state. The home is being presented by the Snohomish Electric Development League, with which is cooperating the Northwest Electrical Service League. The "Electric Home" which is a modern residence of moderate cost, is conveniently located, and the advertising and publicity is expected to insure a large attendance. Mayor W. H. Clay of Everett has agreed to proclaim the period as the "Everett Electrical Week."

San Francisco Awards Contracts For Moccasin Creek Plants

Contracts for the Moccasin Creek plant of the city of San Francisco's Hetch Hetchy project have been let by the board of public works of that city. The Pelton Water Wheel Company was awarded the contract for the four 25,000-hp. double overhung impulse wheels on a bid of \$248,000 while the General Electric Company received the award for the four 20,000-kva. generators on a bid of \$260,825. The latter figure includes the exciters and one spare exciter set. The contract for eight 36-in. valves was awarded to the Coffin Valve Company on a bid of \$37,586. All of the contracts specified delivery between April 15, 1923 and August 31, 1923.

Salt Lake City's second Electrical Home is now in course of construction, and is expected to be ready for opening about June 15th. R. W. Butler, manager of the Mine and Smelter Supply Company is building the home for his own use, but has granted permission to the Rocky Mountain Electrical Co-operative League to exhibit it as model electrical home. It will be a beautiful 6-room bungalow, costing about \$6,500 complete, and located at Fifth East Street and Ramona Avenue.

Seattle's first radio show, which has been set for June 5-10, shows every indication of being a splendid success from every standpoint. In addition to the exhibits of the Radio Corporation of America, the Westinghouse Electric and Manufacturing Company and numerous other radio concerns, there will be exhibits and operations of the signal service departments of the Army and Navy, and of the engineering department of the University of Washington. The show is being staged by the Seattle Radio Association and the Totem Radio Club, and managed by J. W. A. Bollong, Seaboard Bank Building.

Books and Bulletins

PRINCIPLES OF ALTERNATING CURRENTS

By RALPH R. LAWRENCE, associate professor of electrical engineering, Massachusetts Institute of Technology, Member A. I. E. E. 6 by 8 in. 121 diagrams. \$4. McGraw-Hill Book Company, Inc., New York.

The book is one of a series outlined by a committee of professors of electrical engineering, consulting editors and engineers as suitable texts for colleges. It consists of a compilation of notes on alternating currents used for several years at the Massachusetts Institute of Technology with junior students in electrical engineering. It is of a highly technical nature, designed primarily as an advanced college textbook, but should also prove valuable to the electrical engineer as a source of reference. The discussion of the theory of advanced electrical engineering is well illustrated by problems involving the various references. Charts are also used extensively to illustrate the discussion and the problems. The book should prove a valuable addition to the list of engineering texts, especially in view of the explanation and discussion of some of the more recent developments.

ALTERNATING CURRENTS

By CHESTER L. DAWES, S.B., assistant professor of electrical engineering, the Harvard Engineering School; Member, A. I. E. E. 6 by 8 in. 526 pages. 406 illustrations and diagrams. \$4. McGraw-Hill Book Company, Inc., New York.

This book is Volume 2 of a course in electrical engineering prepared for the series of engineering texts which are being compiled under the supervision of a group of engineering specialists. The volume is elementary in character and acts as a stepping stone to the more advanced texts of the series. While primarily a text book for the student, it should prove valuable to the man who desires a thorough knowledge of the principles of alternating currents and alternating current machinery. It contains innumerable problems and diagrams to illustrate the discussion of the various formulæ. Laboratory tests are also outlined. There are also many excellent illustrations. The final chapter on illumination and photometry is especially interesting.

Benn Brothers, Ltd., London, E. C. 4, publishers of the "Electrician," have issued the Electrical Trades Directory and Handbook for 1922. In addition to a handbook section devoted to tables, specifications, import duties, societies, a legal digest and other features, the book contains a complete list of electrical engineering firms, manufacturers of electrical apparatus, agents, etc., for England and the colonial possessions. There is also a department devoted to the electrical industry on the continent. The Blue Book costs 25 shillings net. It is a most comprehensive publication and covers the entire English electrical industry.

Meetings of Interest to Western Men

A. A. E. Salt Lake Convention Plans Progressing Rapidly

Arrangements are well under way for the annual convention of the American Association of Engineers to be held in Salt Lake City, June 5 to 8 inclusive.

Plans for the convention and entertainment include two sessions each day for three days, with entertainment features during this time, when the delegates are not in business session. Some of the entertainment features will be an organ recital, a smoker, a trip to Saltair and a banquet. All of the business sessions and formal dinners will be in the Hotel Utah.

C. J. Ullrich is chairman of the general convention committee, with C. E. Painter and H. G. Harmon assisting him. Mrs. R. E. L. Collier is chairman of the women's entertainment committee, and there are eighteen sub-committees working on details of the convention.

Present indications are that the convention will be attended by at least 400 delegates, many of whom will bring their wives with them.

Plans Progressing for Northwest Convention at Boise

Arrangements for the annual convention of the Northwest Electric Light and Power Association to be held in Boise, Idaho, June 7, 8 and 9 are proceeding rapidly according to an announcement just issued by the committee in charge of the sessions. Preparations are being made for the entertainment of a large number of representatives from all branches of the electrical industry in Washington, Oregon, Idaho and Utah.

A tentative program has been drawn up including not only the regular committee reports but also talks by M. H. Aylesworth, executive secretary of the National Electric Light Association, and Franklin T. Griffith, member of the executive committee of the same association.

Elaborate preparations are being made for the entertainment of the delegates. There will be the annual Kilowatt golf tournament, while the second annual Northwest Polo Tournament will be held at the same time. On the last day of the convention automobiles will be furnished to take all the delegates to the Arrowrock Dam, where the annual banquet will be served.

The following committees have been named to act during the convention:

Program Committee

F. J. Orr, Boise, Idaho, Chairman; W. H. McGrath, Seattle, Washington; Geo. L. Myers, Portland, Oregon; P. M. Parry, Salt Lake City, Utah.

Reservation and Transportation

W. L. Baker, Chairman, Idaho Power Co., Boise, Idaho; Fred Mann, Owyhee Hotel, Boise, Idaho.

Registration Committee

E. L. Parrott, Mrs. Nina Johns, Miss Mae-wood Ramsay.

Reception Committee

Mrs. W. R. Putnam, Chairman.

Entertainment Committee

R. B. King, Idaho Power Co., Chairman; Roy Walker, Walker Electric Company; N. H. Callard, Westinghouse Elec. and Mfg. Co.; R. E. Jerauld, General Electric Company; E. C. Kiersted, Idaho Power Company; Fred J. Rankin, Idaho Power Company; Carl Werneike, Westinghouse Electric Company; H. L. Bargion, Montana Electric Supply Company; J. A. Kahn, Capital Electric Company; Z. S. Gwaltney, Idaho Electric Supply Company; F. M. Rising, Wood River Power Company; A. E. Janssen, Idaho Power Company; H. L. Senger, Idaho Power Company.

Portland A. I. E. E. and N. E. L. A. Sections Hold Meeting

Through the courtesy of the local officials of the Pacific Telephone and Telegraph Company at Portland, the Portland Sections of the American Institute of Electrical Engineers and the National Electric Light Association had the privilege of seeing the telephone show and demonstration at their April joint meeting. This show, which is put on by members of the local telephone company, consists of a demonstration of both manual and automatic switching as well as several high class instrumental and vocal selections. The program included an address, "Your Telephone Company," by I. T. Felts, a switchboard demonstration by Miss Ella Ackerman of the traffic department assisted by several young ladies, a moving picture, "Speeding the Spoken Word," and a paper, "Some Fundamental Features of Machine Switching," by A. E. Burns. The educational as well as the entertainment features of the program were enjoyed by the 150 or more that crowded the Library Hall.

The last regular meeting of the year will be held during the latter part of May and will be featured by an electrically cooked supper followed by a short business meeting announcing the election of officers, and a dance. A radio telephone concert will be given during the course of the dinner.

British Columbia Company Plans \$10,000,000 Development

Announcement of plans for hydroelectric development at Stave Lake, British Columbia, costing \$10,000,000 has been made by the British Columbia Electric Railway Company, Vancouver, B. C., contingent upon the raising of this amount of new capital, which in turn is contingent upon satisfactory arrangements being made with the civic and provincial governments regarding the continuance of present street railway fares.

The announcement was made at the time of the company's application for a federal charter which would place it under Dominion rather than provincial or civic control. This application was rejected by the railway committee of the House of Commons at Ottawa, but the provincial government has agreed to appoint a commission to adjust the company's fares. As the permission to charge the present fares expires on June 30, when the company would revert to the original franchise terms, it is necessary to make arrangements before that date with the city of Vancouver and other districts, pending the appointment of the provincial commission.

The company proposes to spend \$1,000,000 this year in hydroelectric work at its Stave Lake plant. For the first time since records were taken, there has been extremely low water both at Stave Lake and at Lake Coquitlam, where other plants are located, causing the operation of the company's steam standby plant at Vancouver, for the first time in eight years. As a safeguard against a repetition of the shortage, which was costly to the company due to the price of oil, it is proposed to raise the dam at Stave Lake, thus impounding a greater quantity of water. Extremely dry weather, together with low temperatures in the mountains preventing the thawing of snow during February and March, was responsible for the low water.

Further capital outlays are required for gas mains and street railway extensions, but until stabilized conditions can be obtained, the company says it is impossible to go ahead with these improvements.

Colorado engineers held a general engineering meeting at the University of Colorado on May 5 under the auspices of the Denver section of the A. I. E. E. and the Colorado Engineering Council. Dr. Willis R. Whitney, director of the research laboratory of the General Electric Company, and L. T. Robinson, engineer of the same company, were the speakers.

The Japanese government mint at Osaka has recently completed a series of tests with electric furnaces for melting copper for coinage. The results proved so satisfactory that a number of 130-kw. furnaces have been ordered for installation in the mint.

The state of Washington received a total of \$221,657.67 from the April sale of state lands and timber, according to the report of State Land Commissioner Savidge at Olympia. The state received practically \$11,000 more than the appraised value of the whole.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

NATIONAL ELECTRIC LIGHT ASSOCIATION

Annual Convention—Atlantic City—May 15-19, 1922

C. E. Ingalls has been appointed western district representative for the Industrial Controller Company of Milwaukee. He has established offices in the Rialto Building, San Francisco.

R. J. Davis, sales representative of the Century Electric Company of San Francisco, has gone to St. Louis on an extended business trip.

Baker and Walford, contractors of Missoula, Montana, have received an entire carload of conduit pipe to be used in wiring the new buildings for the University of Montana, which are to be built at Missoula this summer. This is one of the largest construction jobs in the state.

E. I. Williams, assistant sales manager of the electric range and appliance division of the Estate Stove Company, Hamilton, Ohio, is making a tour of Pacific Coast cities investigating market conditions.

The Electro Apparatus Company, dealers in motors, instruments and appliances, has established a salesroom and factory at 921 Twelfth Avenue, Seattle. George W. Stallings is manager and L. R. Kettenring is illuminating engineer for the new company.

David Dickson, electrical sales engineer, has established offices at 433 Perkins Building, Tacoma, Wash., as a representative for manufacturers of electrical equipment and power apparatus. He also is district representative for the Road Builders' Equipment Company of Portland.

The Paul Maehler Company, Chicago, manufacturers of industrial ovens, has issued a new catalog describing its products in detail. The book contains a discussion of the various types of fuel used for heating ovens with a special section devoted to electrical heat. Considerable space is also devoted to industrial applications of the ovens.

Manufacturer, Dealer, and Jobber Activities

Ward Akeley, contractor-dealer of Long Beach, Cal., has been awarded one of the largest electrical contracts which has ever been let in that city. The contract calls for furnishing almost every type of electrical convenience for the new ten-story Hubbard apartment-hotel which is being erected in that city.

A. F. Henderson, president of the Electrical Material Company, Chicago, has announced that his company is moving its headquarters from 618 West Jackson Boulevard to 158 West Lake Street. The new four-story building which the firm will occupy will give them greatly enlarged quarters so that it may better care for its rapidly increasing business.

The Page Steel and Wire Company, Bridgeport, Conn., has just issued a new handbook describing and illustrating the latest developments in the welding field. In addition to describing Pagt-Armco welding rods and electrodes, the booklet contains much valuable information such as the American Welding Society standards for welding, and various U. S. Bureau of Standards specifications.

The Stephens-Adamson Manufacturing Company of Aurora, Ill., announces that its recently established Los Angeles branch factory is completely equipped to handle orders of any size for complete equipments for elevating, conveying, screening and transmission service. The factory branch was established to care for the rapidly growing western business.

The Kingsbury Machine Works, Philadelphia, has issued a new catalog describing Kingsbury thrust bearings. The book contains a discussion of the design of the bearings, various tests which have been made, the results of many installations in both power plants and ships, as well as a technical discourse on the general subject of vertical and horizontal thrust bearings. It is well illustrated and contains much valuable information for the power plant engineer.

The Ingersoll-Rand Company, New York, has issued Bulletin No. 10,004 describing Price type "PO" horizontal single cylinder, single acting, direct injection oil engines. One of the outstanding features of the new engine is the shape of the combustion chamber and the design and arrangement of the spray nozzles for the direct injection of the fuel. The system eliminates the use of high pressure air for fuel injection and atomization. Other important features are the pressure lubrication system for oiling important bearings, the continuous filtration of the lubricating oil, and the completely water-jacketed cylinder barrel and heads.

The Herberts Machinery and Supply Company of Los Angeles and San Francisco has been appointed exclusive representative for California, Arizona and Nevada for Norton grinders.

H. T. Titus has been appointed Los Angeles representative for the Square D Company, manufacturers of switches. He will handle the southern California territory under the direct supervision of E. S. Conrad, western manager, whose headquarters are in San Francisco.

Nollenberger and Dörner, Denver electragists, have combined their motor shop and store at a new location, at 328 15th Street, in what is said to be one of the most attractive electrical shops in that city.

The Wise-McClung Manufacturing Company has established a representative in the Rocky Mountain territory in the person of Fred R. Smith to push the sale of America vacuum cleaners.

The Mine and Smelter Supply Company has added a radio department to its main store in Denver under the direction of F. C. Dodge.

Scott Brothers Electric Company of Denver has added the Laundryette washing machine and the Torrington vacuum cleaner to its line of major appliances.

J. W. Hartman, for many years with the Le Blond Machine Tool Company, has been appointed southwestern manager for Eccles and Smith, with headquarters in Los Angeles. He succeeds R. A. Case, who has been made general sales manager with headquarters in San Francisco.

The owners of the Marsh patent have made certain changes in Schedule B, which became effective April 25. These changes consist in the abolishment of list prices and discounts formerly contained in Schedule B, and the establishment of certain minimum prices for the various devices which are listed in the schedule. This enables each licensed manufacturer to establish his own list prices and discounts and the only restriction with reference to prices placed upon the licensee by the owners of the Marsh patent is that the licensee shall not at any time sell the licensed appliances at prices lower than the minimum prices established by the schedule.



CHARLIE, THE CHAMPION

This explains why Charles Hillis, vice-president and treasurer of the Electric Appliance Company, San Francisco, wins all of the cups at the various jobbers' conventions. He even plays indoors. No, it was not raining in Los Angeles the day this picture was taken, but the various members of the advisory committee of the California Electrical Cooperative Campaign were just demonstrating their prowess. Left to right, they are K. E. Van Kuran, Los Angeles district manager of the Westinghouse Electric and Manufacturing Company, wondering who wins his dime for distance; Glenn Arbogast of the Newbery Electric Corporation, Los Angeles; H. H. Courtright, manager of the Valley Electric Supply Company, Fresno; C. L. Chamblin of the California Electrical Construction Company of San Francisco, wearing the complacent smile he always adopts when in Los Angeles; N. W. Graham, Los Angeles, wondering whether jobbers should carry clubs in stock; Robert Eltringham, manager of the Cooperative Campaign, at home anywhere in California; A. W. Childs, superintendent of sales, Southern California Edison Company, the only man with clean hands; "Charlie the Champion" and George T. Bigelow, Riverside, not bashful for Charlie tried to "grab" all of the picture.

D. E. Bent, who was recently elected president of the New Mexico Electrical Association, comes from a pioneer family in the electrical industry. His father, A. E. Bent, developed a number of small lighting plants in the Missouri Valley and the Rocky Mountain Region in the late nineties. It was through these companies the son, D. E. Bent, received his early training and at the present time he is manager of the Tucumcari Light and Power Company, of



D. E. BENT

which his father is the president. It was only a few years after D. E. Bent was born in Lamar, Colo., November 23, 1890, that his father built the first lighting plant in that city, using two old Edison bi-polars. He received his high school education in Denver and was graduated from the Massachusetts Institute of Technology in 1912. He then entered the General Electric Company course at Schenectady and then transferred to the sales department of the Electric Storage Battery Company. In October, 1913, he started work on his father's properties and these duties included firing boilers, wiring houses, collecting bills, and the many kindred jobs required at small central stations. For the finishing touches in this work he attended the Central Station Institute of the Chicago Commonwealth Edison Company. Successively taking charge of the Eldorado Springs and La Plata, Mo., plants, he disposed of them at a profit, and in October, 1917, assumed the management of the Tucumcari, (New Mexico) Light and Power Company. He is also general manager of the other A. E. Bent interests, and found time to serve as a representative of his district in the 1921 session of the state legislature.

W. M. Deming, formerly president of the Technical Publishing Company of San Francisco but more recently president of the Electrical Supply Company of Memphis, Tenn., is again in San Francisco and will remain in the West indefinitely.

Vivian Brain, son of O. W. Brain, chief electrical engineer of the New South Wales Government Railways and Tramways, recently arrived in San Francisco from Australia. He is on his way to Schenectady to enter the testing department of the General Electric Company, to obtain some practical experience before returning to his native country to take a position with the railways.

Personals

W. C. Sterne, president of the Municipal Properties Investing Company of Denver, and chairman of the Rocky Mountain Committee on Public Utility Information, has been named chairman of the electrical bureau of the Denver Civic and Commercial Association. George E. Lewis, executive manager of the information committee was named secretary of the bureau, while E. C. Headrick, chairman of the advisory committee of the Denver Electrical Cooperative League, and D. C. McClure, electrical superintendent of the Denver Gas and Electric Light Company, were elected to the board of directors.

Charles H. Small, for the past year referee of the Colorado Industrial Commission, has been appointed secretary of the Public Utilities Commission of that State. The position has been vacant for six months.

Fred Skeels, sales manager of the Crouse-Hinds Company, is a recent Pacific Coast visitor and was in attendance at the quarterly meeting of the Pacific Coast Electrical Jobbers Association which met at Del Monte the latter part of the month.

J. B. Fullerton, manager of the Apex Electric Company, S. W. Murray of the Illinois Electric Company and C. W. Butterworth, of the Graham Reynolds Electric Company, are three prominent Los Angeles members of the electrical industry who recently were in San Francisco in the interests of their various companies.

R. E. Fisher, vice-president in charge of the sales of Pacific Gas and Electric Company, and A. Emory Wishon, general manager of the San Joaquin Light and Power Corporation, have been nominated to the board of directors of the California Development Association, a statewide organization devoted to the industrial and agricultural welfare of California.

Dr. Thomas Addison, Pacific Coast manager of the General Electric Company, has just returned to his offices in San Francisco after a trip to Eastern business centers.

F. M. Thebo, consulting engineer and member of the firm of Thebo, Starr and Anderton, of San Francisco, recently arrived from Japan on the steamer Taiyo Maru. Mr. Thebo's firm is supervising the installation of a large hydroelectric plant on the river Kiso in the southwestern part of Japan.

Y. Tachikawa, director of the Tokyo Electric Company, and his son, R. Tachikawa, sales manager of the same company, left San Francisco for Japan on May 11, after an extended visit to the various manufacturing centers of the East.

D'Arcy Ryan, illuminating expert for the General Electric Company who had charge of the designing of the illuminating effects of the Panama-Pacific International Exposition, is a recent San Francisco visitor. Mr. Ryan has just returned from Rio de Janeiro where he supervised the designing of the illumination scheme of the coming international exposition to be held in the Brazilian city.

Roy G. Munroe, formerly industrial fuel expert for the Denver Gas and Electric Light Company, has been promoted to the post of assistant commercial manager. G. A. Hamilton will take the position left vacant by the promotion of Mr. Munroe, while J. R. Huntington, will act as assistant in the industrial fuel department.

E. P. Bacon, vice-president and general manager of the Natrona Power Company, of Casper, Wyoming, and president of the Rocky Mountain Division of the N. E. L. A., was elected president of the Wyoming Utilities Association at the recent convention of that organization at Cheyenne. Other officers elected were C. L. Titus, Cheyenne, first vice-president, James Potts, Rawlins, second vice-president, J. G. Keegan, Cheyenne, treasurer, and M. C. Chappelle, Greybull, secretary.

K. E. Van Kuran, Los Angeles district manager of the Westinghouse Electric and Manufacturing Company, and president of the Los Angeles Electric Club, and H. L. Harper, manager of the Los Angeles branch of the Western Electric Company and past president of the club, took a prominent part in the inaugural exercises of President R. B. von Klein Smid of the University of Southern California recently.

Carl Heise, San Francisco district manager of the Westinghouse Electric & Manufacturing Company, recently left for a visit to the company's factory at East Pittsburg, Pa. He will be gone from his office for several weeks.

W. E. Martin, recently placed in charge of marine work for the Westinghouse Electric and Manufacturing Company on the Pacific Coast, will make his headquarters in San Francisco. Before coming West he was well known in eastern marine circles. Mr. Martin has been interested in electric propulsion and auxiliaries for ships for many years. Since he joined the Westinghouse Company in 1915 he has been an



W. E. MARTIN

active proponent of the Diesel electric propulsion idea for certain types of vessels. Although born in Brooklyn, New York, Mr. Martin claims the West as his home, for he moved with his parents to Denver, Colorado, in his early youth and it was there that he received his degree in electrical engineering from the University of Colorado. Mr. Martin is an associate member of the A. I. E. E. and the Society of Terminal Engineers.

M. W. Birkett has been named acting general manager of the Washington Water Power Company of Spokane, Wash. Mr. Birkett began his career with the company in 1908 as a technical clerk in the transmission line office immediately after his graduation from the department of electrical engineering of the University of Wisconsin. In 1910 he became assistant superintendent in charge of transmission lines and substations, having



M. W. BIRKETT

charge of these departments during the period when the company was expanding on all sides. He became assistant general manager in 1918. While one of the youngest of the executive officers of the Washington Water Power Company in the point of years, Mr. Birkett is one of the oldest in service and range of experience, having been actively connected with it for thirteen years. He is a member of the Spokane Chamber of Commerce, the Transportation Club, the University Club, the Rotary Club and the Spokane City Club.

Charles H. Peirson, formerly advertising agent, is now supervisor of public information for the Southern California Edison Company. Mr. Peirson has been with the Edison company for thirteen years. He has had much experience as a writer, having been at one time connected with the Associated Press, and since entering the electrical business, he has contributed articles and sketches of general interest to the industry. In addition to his regular duties, he has found time for special work on numerous committees, and at the present time is chairman of the publicity committee of the Pacific Coast Electrical Association.

C. C. Hillis, vice-president and treasurer of the Electric Appliance Company with headquarters in San Francisco, was the winner of the famous Jobber's Cup at the recent golfing tournament at Del Monte. Robert Sibley, editor of the Journal of Electricity and Western Industry, won the Deming Trophy and G. E. Armstrong, Pacific Coast editor of Electrical World, the Turner Trophy at the golf tournament.

E. O. Wattis, vice-president of the Utah Construction Company of Ogden, Utah, is a recent San Francisco visitor. It will be remembered that this company is taking an active part in the construction of the Hetch Hetchy project for the city of San Francisco.

N. A. Graham, of the Graham-Reynolds Company; C. B. Hall of the Illinois Electric Company; H. L. Harper of the Western Electric Company; J. P. Jones of the Westinghouse Company; S. M. Kennedy, vice-president of the Southern California Edison Company; A. L. Kline of the Western Light & Fixture Company; A. W. Childs, chairman of the Advisory Committee, California Electrical Cooperative Campaign; and A. Emory Wishon, general manager of the San Joaquin Light & Power Corporation were among the Los Angeles and Fresno visitors at the recent Del Monte Convention of the Pacific Coast Electrical Supply Jobbers' Association.

J. F. Fenwick, secretary and assistant manager of the Hawaiian Electric Company, Ltd., Honolulu, T. H., was a recent interested visitor at the Pacific Coast Convention of the Electrical Supply Jobbers' Association at Del Monte.

Richard E. Smith has been promoted to the position of advertising agent for the Southern California Edison Company. Mr. Smith joined the Edison organization in 1915 as an illuminating engineer. Later he represented the company in Visalia and Tulare, and for the past three years he has been in the general offices in Los Angeles. He has given close study to all classes of advertising, and the field he is now entering will give ample opportunity for the use of knowledge thus accumulated.

Lee H. Newbert, Alameda manager of the Pacific Gas and Electric Company; W. S. Greenfield of the Allied Industries Company, Inc.; N. W. Gray, manufacturer's agent; L. W. Davis, Westinghouse Electric and Manufacturing Company; George E. Armstrong, Pacific Coast Editor of Electrical World; Nick Abrams of the Western Agencies Company, Inc.; R. M. Alvord and E. O. Shreve of the General Electric Company; Roscoe Oakes of the National Carbon Company; Harry Daly of the Majestic Electric Development Company; Robert Sibley of the Journal of Electricity and Western Industry; A. M. Irwin of the Westinghouse Electric and Manufacturing Company; S. B. Gregory of the Arrow Electric Company and Norman S. Gallison of the Journal of Electricity and Western Industry, were among the visitors who attended the recent convention of the Pacific Coast Electrical Supply Jobbers' Association at Del Monte.

W. L. Frost has recently been advanced from the position of assistant to the vice-president to that of manager of the consumers' department, Southern California Edison Company. Mr. Frost has been with the Edison company for twenty-three years, having started as a groundman, and worked through the various departments to his present position. He will be remembered by all as the competent chairman of the entertainment committee which staged the big N. E. L. A. Convention at Pasadena. Mr. Frost is a member of several committees in the Pacific Coast Electrical Association, and also vice-president of the Electric Club of Los Angeles.

Robert N. Lynch, vice-president of the San Francisco Chamber of Commerce, recently returned from an extended visit to the East during which he delivered addresses in nearly all of the eastern states on the industrial possibilities of San Francisco and the West.

John A. Britton, first vice-president and general manager of the Pacific Gas and Electric Company, is in attendance at the annual convention of the National Electric Light Association at Atlantic City. He will return in time to take part in the activities of the Pacific Coast Electrical Association, Los Angeles, May 31-June 2.

David T. Babcock, head of the Los Angeles office of Blyth, Witter and Company, and a well known authority on hydroelectric securities, after addressing the Bankers' Association of San Bernardino County the latter part of April has left for a European trip to be gone several weeks.

Al Reese of the North Coast Electric Supply Company with headquarters in Seattle, was the sole representative of the Northwest at the recent quarterly meeting of the Pacific Coast Electrical Supply Jobbers' Association at Del Monte.

Herbert Metz, sales manager of the power and light division of the Western Electric Company, New York, is a recent San Francisco visitor, having come to the Pacific Coast to personally investigate the enormous construction program which is under way in the West at the present time.

V. L. Board, twelve years a member of the Doherty engineering staff, has been appointed to the newly-created position of assistant general manager of the Denver Gas and Electric Light Company. Mr. Board not only succeeds to the responsibilities of the operating de-



V. L. BOARD

partment but he also will exercise executive supervision over all branches of the company's activities. Mr. Board was graduated from the University of Missouri in 1910. He became identified with the Denver Gas and Electric Light Company the same year in the capacity of junior engineer, remaining in Denver two years. He then was transferred to the New York offices of the Doherty interests where he engaged in engineering and rate work. In 1917 he was assigned to special work with the Denver company. Mr. Board is secretary-treasurer of the Rocky Mountain Committee on Public Utility Information. He was instrumental in the organization of the Committee. Mr. Board is a member of the American Institute of Electrical Engineers, the Sigma Xi, and the Tau Beta Pi honorary engineering fraternities.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Spring trade is well under way in nearly all lines. The automobile and motor truck lines, railroads and dealers in contractors' equipment have begun to feel the beneficial effects. The annual Spring Market Week, just closed, resulted in an enormous turnover of goods, according to jobbers.

With the basic industries there is increasing activity, and coastwise shipping is making slow gains. Lumber is the chief cargo of the coast vessels. Real estate transfers have fallen below the high average set during April, but trading is still active. Building activity continues. During April there were 766 permits totaling \$3,993,720 issued. Bank clearings showed a gain of approximately 17 per cent over the corresponding month last year.

Good weather has increased the movement of early vegetables and canneries are already operating on both spinach and peas. Last year's stocks of these two commodities are cleaned up. Shippers estimate that over 50,000 cars will be needed to carry northern California's fruit and vegetable crop this year.

There is a good demand for bonds, and issues by municipalities, counties and school and irrigation districts are being absorbed by the bond houses as rapidly as issued at a substantial premium. Money is plentiful at 6 per cent.

PORTLAND

Business in general seems to be improving as a result of recent fine weather. Residence building is very active, and railroad improvements and highway construction are getting started on a large scale. The demand for lumber is increasing steadily week by week, both for export and domestic consumption. The lumber industry of the Northwest is now in better shape than it has been in for nearly two years, and the prospect for the future is very bright. The longshoremen's strike as yet has little affected loading and unloading of vessels, the work being handled so far with very little delay by non-union workers.

Although the growing season is four to six weeks late in starting, prospects are excellent for large crops of everything this summer and fall. Spring work is progressing nicely with the farmers catching up with their planting in most sections.

Electrical jobbers and manufacturers report business somewhat improved during the past few weeks. Inquiries are active and prospects generally look brighter. There is a very heavy demand for wiring devices and materials of all kinds due to the activity in residence and apartment construction. Contracting is quite active, but store sales are rather poor.

SEATTLE

With the defeat at the May 2 election of the Erickson "three-cent carfare" bill, designed to place the burden of maintenance and operation of the Seattle municipal railway system upon the general taxation fund, building projects totaling \$7,000,000 and involving at least a dozen important projects, will proceed.

Reports on the unemployment situation indicate a material increase from week to week in the demand for both men and women workers. Nearly 100 per cent of the large lumber manufacturing plants of the Northwest are reported producing, with eleven of the plants working two eight-hour shifts, and two working three eight-hour shifts. About 50 per cent of the small mills are cutting, with plans to double last year's output.

More than \$100,000,000 is the gain which Seattle's total foreign and domestic water-borne commerce is piling up for 1922 as compared with last year. The first quarter of the year showed a gain of \$27,412,625 as compared with the first quarter of last year. Seattle's total water-borne commerce in 1921 amounted to \$264,976,549, and it is expected the 1922 record will total not less than \$474,627,049 at the rate of increase during the first quarter.

SALT LAKE CITY

In local financial and business circles conditions have been rather quiet during the past two weeks. Money is easier, and there is a general tone of betterment being felt.

The industrial situation is improving rapidly, and with this improvement is noted a change for the better in the unemployment situation. Work in mines, on farms, and public improvements is being furnished to an increasing number of men.

Building activity is creating an increased demand for builders' hardware and electrical construction materials, and many new home owners and prospective new home owners are becoming interested in electrical appliances.

Copper mining activities are gradually increasing, and in the mining camps where silver and lead are the principal metals mined, conditions are very satisfactory. Mining companies are planning increased development work, and new ore bodies are being opened up.

Good progress has been made by the farmers in getting their crops in, since the recent moderation in weather conditions, and the people in the agricultural districts are looking forward to a good year. Wool prices are much more satisfactory than for some time past.

DENVER

Total building permits for April amounted to over \$1,800,000, the second highest figure in the history of the city. There is every indication that this building boom will continue and this fact is adding considerable optimism to the outlook on summer business.

The banks reported increased clearings in April and these reports show more available money for loans than in some months past. The prevailing rate of interest is 7% but numerous loans are being made on improved city property and on farms on a 6% basis.

Plenty of moisture during the past fortnight has cheered the farmer. Beet contracts, although slow at first, are now up to last year's record of acreage. One prominent sugar factory which was closed last year is now being put in shape for the campaign this year. Regardless of recent markets, there seems to be considerable faith in forage crops.

With improved conditions in both country and city and less unemployment, it is generally agreed that business in this region is on the up-trend. Retail sales in all lines are picking up and especially in the electrical appliance line with vacuum cleaners and washing machines. Generating and transmission equipment is still moving slowly.

LOS ANGELES

Los Angeles building permits for April reached a new high mark of \$12,959,686, of which \$5,087,701 was for housing. In spite of attention drawn to the volume of building in the city of Los Angeles a recent check shows a greater per cent increase to be going on in the nearby cities of the Southwest. Los Angeles increased 80 per cent over April, 1921, while 33 other cities of the Southwest combined to show a 90 per cent increase as compared to the same month of last year. Plans have been announced for an industrial exposition to be held Aug. 26 to Sept. 9 with 600,000 sq. ft. available. This will accommodate three times the amount of exhibits in last year's show.

Bank clearings are increasing at the rate of 16 per cent over 1921. Retail stores have cause for complaint in the slow turnover in light weight goods. Cool weather continues with more snow-fall of 2 to 10 inches in the San Bernardino and Sierra Madre Mountains. Recent price reductions in fabricated steel have stimulated sales efforts of steel shops with the result that five times as many steel frame buildings are now under construction as compared to same period in 1921. Electrical dealers continue to clamor for radio supplies and find no apparent limit to quantity to be sold.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

THE PACIFIC CENTRAL DISTRICT

MANTECA, CAL.—The Manteca Cheese Co. has signed a contract for a large factory to be built on Oak Street. J. R. Bell has been re-elected president of the company.

SUSANVILLE, CAL.—Lassen county's first grain elevator will be constructed when a modern flour mill is built here by J. A. Noggle and Son during the summer. The building will be of reinforced concrete.

ANTIOCH, CAL.—Bonds to the amount of \$96,000 have been voted for the construction of a reservoir, piping of water and a pumping system to supply the city's needs. Antioch owns its own distributing system.

EXETER, CAL.—Grading and other preparations are being made for the erection of two packing houses on the Santa Fe, one mile south of Exeter, one owned by B. F. List and the other by C. A. Hahn and L. Thomas.

FRESNO, CAL.—County board of supervisors are quoted as being in favor of the erection of a hall of records in courthouse park. The building would cost not less than \$250,000 according to the plans which have been submitted.

SAN FRANCISCO, CAL.—A building permit has been issued for the construction of a six-story, Class C hotel building at the southwest line of Mason and Eddy Streets; MacDonald and Couchot, contractors, estimated cost \$140,000.

BERKELEY, CAL.—The Steel Pipe and Tank Co. of California will locate a \$200,000 metal plant here, according to recent announcement. The directors of the company are C. Ramsden, W. Fochay and C. Duffie of Oakland and Berkeley.

FRESNO, CAL.—A 3-story office and newspaper building will be erected at Van Ness and Calaveras Streets by James McClatchy and Company of Sacramento. The building will be occupied by the above company and will cost \$100,000.

SAN FRANCISCO, CAL.—Geo. H. Sandy, owner, is planning the construction of a three-story and basement frame apartment building to be erected on the southwest corner of Dolores and 20th Streets, to cost \$40,000. A. J. Horstmann is the architect.

FAIROAKS, CAL.—Proposed improvements to cost between \$35,000 and \$50,000 are being planned by the Fair Oaks Fruit Co., of which W. W. Hinsel is manager. The tonnage of olive crops has increased so that larger buildings and more modern machinery are necessities.

SACRAMENTO, CAL.—Reconstruction of the ice and cold storage plant of the Consumers' Ice and Cold Storage Company at Eighth and D Streets, recently damaged by fire to the extent of \$50,000, will be started immediately, according to announcement made by company officials.

DAVIS, CAL.—An appropriation of \$15,000 has been made for the construction of additional buildings to the original ranch group of the University Farm, which will include a large implement shed, bunkhouses and a ranch house. Another appropriation of \$10,000 will be used for the construction of a water tower, to be of galvanized steel with a capacity of 100,000 gal. This will not only supply the farm with water but will afford adequate fire protection as well.

STOCKTON, CAL.—S. Kahn, vice-president and general manager of the Western States Gas and Electric Co., has placed an order with the Holt Manufacturing Co. for machinery to be used in Amador, Alpine and El Dorado counties this summer on the big storage project to be developed at Twin Lakes.

SACRAMENTO, CAL.—Plans for the new state printing plant to be erected at Eleventh and O Streets have been approved. Bids for construction will be advertised for at an early date. The plans call for a reinforced concrete building for which funds to the amount of \$142,000 are available.

SAN FRANCISCO, CAL.—Announcement has been made by M. M. O'Shaghnessy, city engineer, that within two weeks bids will be advertised for the pavement of the last section of the Market Street extension, the new low-grade route over Twin Peaks. This last section involves the laying of approximately 4,000 lineal feet of asphalt pavement. It is estimated that the cost will be approximately \$40,000.

SACRAMENTO, CAL.—Betz and Mabrey have been awarded the contract for the construction of a five-story display and warehouse building for the John Breuner Co., on L Street, between 6th and 7th. Dean and Dean are the architects. The cost is approximately \$125,000. Separate bids will be called for immediately for plumbing, heating, electrical fixtures, elevators and sprinkling system. The entire investment will total approximately \$200,000.

SAN FRANCISCO, CAL.—Building permits have been issued for the construction of seven two-story and basement frame residences for Perkins and Trowbridge, owners: A. H. Jacobs, architect, J. Harold Johnson, 180 Jessie Street, contractor. Each building is estimated to cost \$25,000. They are located as follows: one on Pacific Avenue, E. of Scott, one on Jackson Street, E. of Scott, one on the southeast corner of Pacific and Scott Streets, one on the northeast corner of Jackson and Scott Streets and three on Scott Street, N. of Jackson.

SAN FRANCISCO, CAL.—Contract has been let to MacDonald & Kahn for the construction of the Francesca Apartments on the southeast corner of Sacramento and Powell Streets by the Sacramento Powell Company, of which A. C. Blumenthal is president. The building, which was designed by G. A. Lansburgh, will be a ten-story Class A apartment house containing about 225 rooms divided into large residence apartments and will represent an investment of about \$750,000. Excavation will start in about ten days and it is expected that completion will be early next year.

THE PACIFIC SOUTHWEST

PASADENA, CAL.—The contract for underground system in connection with the additions to the ornamental lighting of Grand Avenue and adjacent streets was awarded to W. A. McNally Co. of this city for the sum of \$20,222.

SEATTLE, WASH.—Plans are being made for the issuance of \$75,000 in bonds for the construction of a pumping and chlorination plant at Green River to provide a new water supply for the town of Auburn. The proposed bond issue will be voted on May 2.

PASADENA, CAL.—Additions to the city farm plant for sewage disposal will be made at once as a result of the bond election recently carried which provides the sum of \$412,000 for this betterment.

LONG BEACH, CAL.—The growing importance of this city as an oil producing center has attracted the attention of the Gilmore Petroleum Company and they will commence the construction of an oil refinery at once. The first unit will cost \$100,000.

LOS ANGELES, CAL.—The city has begun the purchase of large quantities of cable and substation apparatus in connection with the improvements to be made on the distribution system recently acquired from the Southern California Edison Company.

SAN BERNARDINO, CAL.—H. E. Jones submitted the successful design for the new city auditorium and the city council has approved the plans. The structure will cost \$200,000 and the bids will be called for at once as the money is available from the last bond issue.

LOS ANGELES, CAL.—An 8-story hotel and apartment building is to be erected in Hollywood for H. H. Christie. According to architect A. R. Kelly the plans provide for nearly 100 rooms and baths. Remodeling of the present hotel on the adjoining property is also contemplated.

SAN BERNARDINO, CAL.—The Santa Fe Railway has approved the plans of its engineers for a power house in this city. The building will cost \$100,000 exclusive of machinery. Engineers for the company, with headquarters in Los Angeles, will call for bids at an early date.

LOS ANGELES, CAL.—Oliver Morosco will erect a 12-story office and theater building on Broadway between 9th and 10th Streets. Milwaukee Building Company is preparing the plans. Financing will be completed at an early date and the call for bids will immediately follow.

LOS ANGELES, CAL.—The L. A. Railway has started the erection of a substation at Kingsley Drive and Melrose Avenue. The equipment will be full automatic and the building will be of brick, to cost \$25,000. General Electric Company received the contract for apparatus.

SAN PEDRO, CAL.—The second unit of the 12,000-ton drydock for the Bethlehem Shipbuilding Company has arrived and the machine shop equipment and motor driven tools to be transferred from the East are en route via the Panama Canal. Large expenditures for installation and additional equipment are contemplated.

PHOENIX, ARIZ.—The Southwestern Portland Cement Company was awarded the contract for 400,000 bbl. of cement by Twohy Bros., who are building 163 miles of cement roads for Maricopa county. The cement mills of Victorville, Cal., and El Paso, Texas, will be operated to capacity on this order until the surplus stock is well advanced.

SANTA BARBARA, CAL.—The report of engineers Quinton, Code, and Hill of Los Angeles calls the city's attention to the urgency of repairing the spillway on the Gibraltar Dam and they estimate the expense at \$90,000. There is grave danger during the rainy season to come if this repair to the spillway and the apron is not completed in advance.

THE INTERMOUNTAIN DISTRICT

BUTTE, MONT.—The contract for the building of a bridge over Fish Creek has been awarded to Louis F. Lepp of Whitehall.

NAMPA, IDAHO.—It is reported that the Idaho Sash, Door and Glass Company, a newly organized concern will erect a brick and concrete sash and door factory to cost when equipped about \$60,000. Mr. Frenzell is president of the company.

DENVER, COLO.—W. J. Cameron & Co., contractors, has been granted a permit for the construction of a three-story brick apartment house to be erected at the corner of East Tenth Avenue and Sherman Street. Work will be started immediately.

GREAT FALLS, MONT.—The board of county commissioners has decided to build the Belt bridge of steel and concrete, instead of solid concrete as intended, it being thought that the foundation was not right at either end for such a bridge as first contemplated.

POCATELLO, IDAHO.—A special bond election will be held in this city on May 27th for an issue of \$50,000 for construction of storm sewers throughout the city, also for \$17,500 for the construction of a bridge over Portneuf River and \$7,500 for street improvements.

DENVER, COLO.—The New Method Cleaners and Dyers Company is planning the erection of a one-story brick building at East Colfax Ave. and Ogden Street, on lots recently purchased for \$12,000. The building will cost approximately \$35,000. Construction will start at once.

PROVO, UTAH.—The entire system of the Utah Power and Light Company, west of University Avenue, will be rebuilt this summer, according to announcement by Ray Timmerman, manager. The reconstruction will cost approximately \$35,000 and work will extend over a period of four months.

NAMPA, IDAHO.—Architect's plans are being perfected for a new Masonic Temple to be erected here at a cost of approximately \$40,000. A Pythian Castle Association was recently incorporated, empowered to purchase and hold real estate. While a Pythian temple is contemplated, work will probably not start during the present year.

IDAHO FALLS, IDAHO.—An ordinance has just been passed by the Idaho Falls city council providing for a special election on May 29 for the purpose of voting bonds amounting to \$250,000.00 for the construction of a filtration plant for the purifying of the city water. The filtering basin will be built by Burns and McDonald, engineers of Kansas City.

POCATELLO, IDAHO.—Contract to regrade preparatory to ballasting thirty miles of O-W. R. & N. Railroad from Huntington west has been awarded to the Morrison-Knudsen Company of Boise. Work will begin at once. A bridge across the Columbia River near Portland is another undertaking planned by this company, also a new trestling plant to cost approximately \$250,000 will be erected this summer at The Dalles, Ore.

BOISE, IDAHO.—Authorization for the double tracking of the Oregon Short Line from King Hill to Medbury has been given by railroad officials and work will be started as soon as preliminary surveys have been completed, according to announcement by H. V. Platt, general manager. The double tracking will consist of about 18.3 miles and runs on both sides of Glens Ferry. The cost is estimated at \$1,250,000 and it is expected that construction will be completed in the fall.

TWIN FALLS, IDAHO.—The Murtaugh Irrigation District will vote on May 15 on the proposed issuance of \$3,700,000 of the district's bonds for the purpose of constructing a hydroelectric power plant and irrigation system for

the reclamation of approximately 40,000 acres of land above the Twin Falls canal system between Hansen and Murtaugh. The district to be reclaimed was included in the original Twin Falls project segregation, and at various times proposals for its reclamation have been under consideration by the Twin Falls Canal Company. This company's filing on the land lapsed some time ago and practically the entire area has been taken up by homesteaders.

OGDEN, UTAH.—Work has begun upon improvements at the union stockyards which will represent an expenditure of about \$50,000. One of the important improvements is the building of a new livestock exchange building with twenty-four offices. This will afford ample room for the commission companies which are represented in Ogden. This building will cost \$20,000. Preparations are also being made to enlarge the sheepyards and equip them with the latest loading and unloading docks. Cement floors are being put in all the pens and several of the stockyards are being enlarged to handle the increased business.

THE PACIFIC NORTHWEST

ROSEBURG, ORE.—Work on a \$100,000 apartment house will be started at an early date by George Kohlhaugen.

BOISE, IDA.—Improvements and additions to the plant of the Boise Cold Storage Company, costing about \$50,000, are planned by the officers of the concern.

OREGON CITY, ORE.—Bids will soon be called for the erection of a new four-story concrete municipal building which will cost approximately \$35,000.

EUGENE, ORE.—Ground will soon be broken for the new \$50,000 plant of the Eugene farmer's creamery, according to announcement of the board of directors.

ABERDEEN, WASH.—A plan is under way to establish a plant to manufacture briquettes from sawdust and mill refuse from the mills in the Grays Harbor district.

SALEM, ORE.—The E. L. Knight Company has been incorporated with a capital stock of \$50,000. The company will manufacture and deal in electrical supplies and machinery.

SEATTLE, WASH.—Improvements to the Lake Washington Canal, to cost about \$460,000, which includes a larger pier, has been recommended to Congress by the Secretary of War.

SPOKANE, WASH.—The erection of a new factory for the manufacture of auto springs is contemplated by the Laher Auto Spring Company, it is reported. A site has not yet been selected.

PORTLAND, ORE.—The Doernbecher Manufacturing Company will erect a six-story concrete warehouse immediately to provide storage facilities for the concern's rapidly increasing business.

YAKIMA, WASH.—Contract for the construction of Richy and Gilbert Company's proposed cold storage plant has been awarded to William Yeaman. It is estimated that the building will cost about \$90,000.

OKANOGAN, WASH.—Bonds in the amount of \$18,500 were recently voted to improve and partly renew the city water system. A new reservoir will be built and new and larger steel mains will be laid in the business section.

SALEM, ORE.—D. S. Beals of Riddle, Oregon, has filed an application with the state engineer for the appropriation of water from South Umpqua river for the development of 250 hp. to supply the town of Riddle and vicinity with light and power service.

OLYMPIA, WASH.—Business men of Olympia have petitioned the city council to install a new boulevard lighting system in the business section of the city. The improvement according to tentative estimates will cost about \$14,000, or about \$1.60 per front foot.

SEATTLE, WASH.—Construction on the five-story orphanage to be erected by the Sisters of the Sacred Heart at 4716—50th Avenue Northeast, has been started. An investment of \$300,000 is represented in the structure which was planned by John Graham, architect.

PENDLETON, ORE.—A bond ordinance for the issuance of \$85,000 of the money recently voted for a septic tank sewer system, has been authorized by the city council. The estimates submitted by Barr and Cunningham, engineers, call for a total expenditure of \$69,919.

WENATCHEE, WASH.—A dam at McLaughlin's canyon on the Okanogan river for the development of 2,500 hp. and the irrigation of 3,200 acres of land is the plan outlined at Riverside. The dam, transmission lines, machinery, pumps and motors will cost about \$200,000.

ENTERPRISE, ORE.—The Enterprise Electric Company, of Enterprise, Ore., has applied to the state engineer for a permit to appropriate 15 sec.-ft. of water from the Wallowa river for the development of power to supply several towns. The estimated cost of the project is \$100,000.

SPOKANE, WASH.—If the town of Hillyard, Wash., will subscribe \$15,000, it is stated that the Western Materials Company, now operating magnesite mines at Valley, Wash., and manufacturers of magnesite, will build a plant which will cost when equipped with machinery, about \$20,000.

EUGENE, ORE.—A \$50,000 hospital building will be erected here this summer by the Eugene Hospital Company, recently incorporated, according to Dr. William Kuykendall, president of the company. The building will be located on Willamette Street, between Eleventh and Twelfth Avenues.

ASTORIA, ORE.—It is reported that a wooden barrel hoop manufacturing company of Michigan will soon shift the scene of its operations to Astoria. The president of the company recently left Astoria for his home to direct the shipment of machinery for the establishment of the initial plant.

PORTLAND, ORE.—Barr & Cunningham of this city have applied to the state engineer for permission to appropriate 25 sec.-ft. of water from the north fork of the Scappoose river, for domestic and industrial supply. A concrete-lined sump, pipe line and electrically driven pumps will be installed at a cost of \$20,000.

VANCOUVER, B. C.—The Granby Mining and Smelting Company will install a huge hydroelectric plant at Anyox this summer, to cost approximately \$500,000. The contract for the erection of a dam has been awarded at a cost of approximately \$350,000. Mr. Valentine Quinn is local treasurer of the Granby Company.

SEATTLE, WASH.—Construction on the new Garfield High School, estimated to cost \$720,000, will be started some time this month and will be completed by September, 1923. Sougan and Chrisman have been awarded the general contract. The building will be three stories in height, of reinforced concrete with tile partitions and walls.

SEATTLE, WASH.—Plans for the immediate construction of a \$110,000 apartment house in the University district were announced recently by the Continental Mortgage & Loan Company. The building, which will be erected by J. S. William, will be a four-story T-shaped structure, containing 33 two and three-room apartments, with all modern equipment.

ABERDEEN, WASH.—The Green Engineering Company of this city has been awarded a contract for the construction of a two-story, concrete office and hotel building at Wishkah and H Streets, to cost approximately \$40,000. The building is one of four concrete structures to be erected on Wishkah Street this summer. The property was purchased recently by Jones and Jones, Inc.

Journal of Electricity and Western Industry

25 Cents a Copy

June 1, 1922

San Francisco

Nothing for the Line.
The holes in the ground
we furnish the tools
for those.

PERFECT LINE:

Walley Cedar Poles
Co. Fir Cross Arms
Porcelain Insulators
Galvanized Hardware
"American Brand" Copper Wire



Pacific Coast Distributors

Baker-Joslyn Company

Los Angeles

San Francisco

Seattle





—an integral part of
“THE PERFECT LINE”
(illustrated on front cover)

PINCO

“The Correct Design”

The line that is equipped with PINCO Pin Type or Suspension Insulators is fully insured. We are prepared to back that up with the necessary guarantees. We invite the most critical investigation by qualified engineers.

Three Pacific Coast Stocks

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

A McGraw-Hill Publication

Founded 1887

ROBERT SIBLEY, Editor

VOLUME 48

SAN FRANCISCO, JUNE 1, 1922

NUMBER 11

Contents

EDITORIALS	435
Human Nature and Political Oratory—New Discoveries in High Tension Phenomena—Introducing the “June Bride to Electrical Gifts—Stabilizing Agricultural Credits by Long Term Loans—“Those Whom the Gods Would Destroy They First Make Mad”—Readjustment of Freight Rates in the Lumber Industry—For a Better Understanding of Our Everyday Problems—“Passing the Buck” Unfairly to the Federal Reserve System—Problems of Production in the Mining Industry.	
DUTIES OF A PERSONNEL DEPARTMENT IN AN INDUSTRIAL PLANT — by Bruce F. Brown	443
How One Successful Western Industry Has Solved Industrial Problems Among Its Workers by Developing the Scope of Its Personnel Department, a Feature Lacking in Many Other Large Industries.	
COMPARATIVE ADVANTAGES OF UNIT AND LINE DRIVE IN INDUSTRY — by H. P. Phillips	445
A Discussion of Mechanical Installations in Some Important Western Industrial Plants Tending to Show that the Adoption of Unit or Line Drive Depends upon the Type of Work to be Done.	
UNIFORM ACCOUNTING FOR MUNICIPAL AND PRIVATE UTILITIES — by Paul Eliel	448
The Public Is Entitled to Know Whether a Publicly Owned Utility Is Operated as Economically and Efficiently as Some Similar Government Unit or Privately Owned Competitor.	
SOME IMPORTANT RECENT DEVELOPMENTS IN WESTERN WATER LAW — by A. E. Chandler	450
A Discussion of the Cases Handed Down by the Supreme Courts of the Western States During the Past Fifteen Months Which Have an Important Bearing upon the Power Company, Irrigationist and Industrial Plant.	
Western Comment on Current Events.....	438
Letters to the Editor.....	440
Builders of the West — Gilbert N. Lewis.....	442
Self Improvement in Salesmanship.....	453
Eliminating the Waste in Industry.....	455
Western Dealer, Jobber and Agent.....	457
Activities of the West.....	460
Meetings of Interest to Western Men.....	465
Personals	466
Manufacturer, Dealer and Jobber Activities.....	468
Business Outlook in Western Market Centers.....	469
Construction News and New Industrial Developments	470

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY OF CALIFORNIA — Rialto Building — SAN FRANCISCO

James H. McGraw
Chairman or Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.

WASHINGTON, Colorado Building
CHICAGO, Old Colony Building
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, 10th Ave. and 36th St.

McGRAW-HILL CO., Inc., New York
Publishers of

American Machinist—European Edition
(Published in London)

Electrical Review and Industrial Engineer
(Published in Chicago)

Chemical and Metallurgical Engineering
American Machinist Ingenieria Internacional
Electrical World Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation Engineering News Record
Coal Age Electrical Merchandising Power

Subscription rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1922, by McGraw-Hill Company of California. Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation.
Printed in U. S. A.

JANKEE
SWITCHES



PERKINS
SWITCHES

See what Bryant has put in a toggle Switch

Months of development,
months of testing before
the defects of ordinary toggle
switches were ironed out.
But they were finally eliminated
and

Now the switch is ready.
It is in most jobbers' stocks.
List price \$0.45 Schedule H2.
Standard Package 50 Carton 10
Capacity 10 amp. 125 volts,
5 amp. 250 volts.

No. 2951

INDICATING FIBRE PLATE.
SHOWS CLEARLY AT A
DISTANCE.
WHITE MEANS "ON"
BLACK MEANS "OFF"

BLACK COMPOSITION HANDLE.
HANDSOME APPEARANCE

LONG MUSIC WIRE
COIL SPRING
MAKES EASY ACTION
AND LONG LIFE

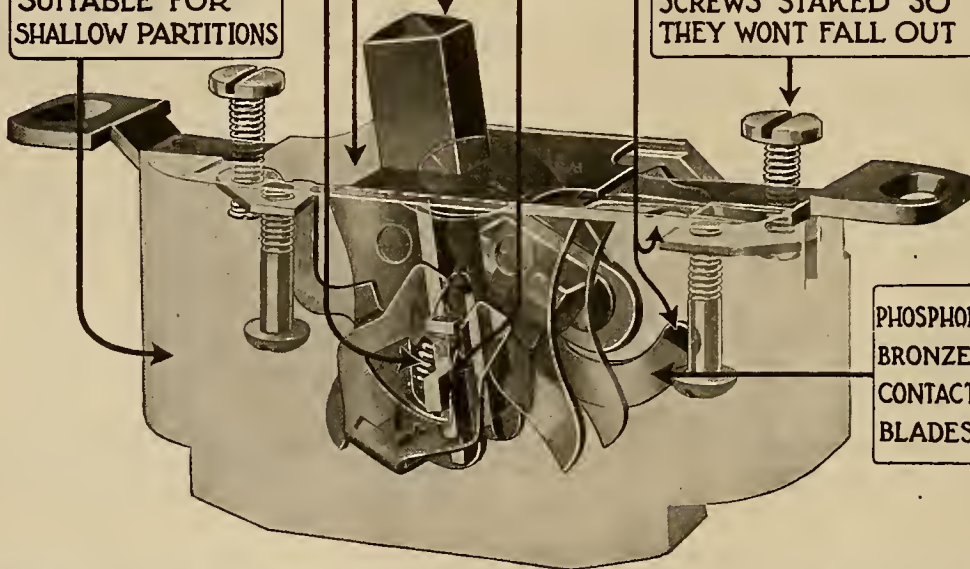
DIRECT ACTION OF LEVER ON
MECHANISM HELPS SPRING
AND PREVENTS STICKING.

WIDE BREAKING DISTANCE
PREVENTS ARCING

SHALLOW CUP.
SUITABLE FOR
SHALLOW PARTITIONS

EXTRA LONG BINDING
SCREWS STAKED SO
THEY WON'T FALL OUT

PHOSPHOR
BRONZE
CONTACT
BLADES



THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK

CHICAGO

SAN FRANCISCO

SPARTAN
RECEPTACLES

PERMA
FLUSH PLATES

D-D
RECEPTACLES

JUNIOR
RECEPTACLES



BRYANT-PERKINS

Journal of Electricity and Western Industry

A McGraw-Hill Publication
ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 11

SAN FRANCISCO, JUNE 1, 1922

Per Copy, 25 Cents

HUMAN NATURE AND POLITICAL ORATORY

PSYCHOLOGISTS tell us that the average mind is inherently lazy. We are likewise informed that in our daily routine we use but a small fraction of our available brain power. Clever politicians have always capitalized upon this tendency to follow the line of least resistance. Hence, the successful politician adopts a catchy slogan, never says anything that is not perfectly obvious, and always tells his constituents something which they already know, or which they accept as being true. He is thus acclaimed as a keen student of human nature,—and this much is true. He undoubtedly is, or he would not be a successful politician, because he is aware of the fact that when the average person reads an article or hears a speech that agrees with his preconceived notions on the subject he thinks that author or speaker is a genius.

What an upheaval would occur if by some method this kink of laziness could be eliminated from the human mind, and each citizen would begin to employ the idle brain cells which psychologists tell us are lying dormant!

Nothing short of a great emergency can weld the thought of a state or nation or direct its energies to unselfish ends. In the absence of an emergency we be-

come self-centered individualists, and as such are "easy plucking" for the clever politician who plays upon our prejudices and greed by his clever slogans and misleading buncombe.

It is time that the people of the West were awakened to the crisis which is impending in our industrial life, the premonitory signs of which are being displayed in California. We refer to the entering wedge of state socialism, the proposed Water and Power bill. This visionary and vicious scheme, concealed behind a smoke screen of slogans and catch-penny phrases strikes at the heart of our long established American institutions. It is inconceivable that the bill should pass, for the average citizen in spite of his shortcomings alluded to above, usually, in the long run can be relied upon to do the right thing.

But what a waste of time, effort and money is annually expended in fighting schemes designed to fleece the unwary, who always rise to the bait of getting something for nothing. The people of California should defeat the proposed Water and Power bill in such a manner that it will not appear on future ballots, in California or other states, in any guise.

New Discoveries in High Tension Phenomena

PROFESSOR HARRIS J. RYAN of Stanford University is again from his research laboratory making announcements that will forward our understanding of phenomena connected with long distance transmission. Some time ago C. P. Steinmetz of the General Electric Company issued a statement that lightning strokes do not involve such extraordinarily high voltages as one would compute when using the common rule of 10,000 volts required per inch of discharge under single 60-cycle discharges. This statement is not only verified by Professor Ryan in his research laboratory at Stanford University, but he has found that the length of discharge increases far more rapidly than the increase in applied voltage. Thus, while it takes six hundred thousand volts to cause a discharge of 90 inches in length, a million volts will cause a discharge of 435 inches, two million volts a discharge leap of 22,000 inches, and, according to the logarithmic law discovered by Professor Ryan, it may be computed that three million volts would cause a discharge length of eighteen miles.

Such length of discharges through the atmosphere on first thought suggest a possibility of transferring large blocks of power through space without the use of wires, but when the enormous power losses occasioned by such discharges are considered this precludes such a possibility.

The subject of high voltage transmission is one of great economic importance to the West and Professor Ryan's discoveries will add greatly to the knowledge of power losses from transmission lines under super voltages. As an instance of this importance it is a well known fact that the great Colorado River project, estimated to cost in all something like \$700,000,000 for the building of giant reservoirs and the transmission of power into industrial centers four or five hundred miles away, could be reduced in development cost by some \$200,000,000 should engineers find a safe and economic method of transmitting power at 500,000 volts instead of the present limitation of 220,000 volts. A debt of gratitude is due Professor Ryan and to Stanford University for the many advances in research investigations that have thus far been added to hydroelectric accom-

plishments in the West. Prospects for further enlightenment from this world-famous laboratory concerning the laws of long distance transmission were never more auspicious.

Introducing the "June Bride" to Electrical Gifts

THE electrical industry in California believes that "Electrical Gifts Make Wonderful Gifts" not only at Christmas but all-the-year-round. To this end, all branches of the industry in that state are united to put over a unique state-wide publicity campaign during the first week of June, which has been designated as "The June Bride Week." The advertising will urge the selection of electrical gifts for wedding presents and point out the advantages of furnishing the new home with electrical appliances.

Official records show that approximately five thousand seven hundred marriages were solemnized in California last June, over one thousand of which were performed in San Francisco. In addition there are hundreds of other "newlyweds" who spent their honeymoon in California. There is no reason to doubt but that the record will be equaled this year.

The enthusiasm with which the idea of "The June Bride Week" has been received by the various interests seems to augur well for its success. The early education of the bride in the comfort, convenience and labor-saving features of electrical appliances will go far toward promoting the electrical idea.

Stabilizing Agricultural Credits By Long Term Loans

THE depression of 1920 and 1921 thoroughly demonstrated in the West the need for some system of long time credit for our agricultural products. The provision in the law which allows only notes of six months maturity to be pledged for rediscount at the Federal Reserve Bank is wholly inadequate to meet the situation. The development and widening of the scope and powers of the Federal land banks so that long-term loans may be furnished to agricultural and livestock interests at a low rate of interest, with the principal of such loans amortized over a long period of years, offers one solution that means much to the upbuilding of the agricultural West. This development can, of course, go on only through the stabilizing of the agricultural industry through the increasing application of scientific methods in the selection and handling of land and its products. Too little attention has been given in the past to this situation. The success on the continent of Europe in prewar times of the great mortgage land banks shows what may be done in our country by the stabilizing of the agricultural industry. The recent, and as yet modest development of the Federal Land Bank shows that investment capital in our country is ready to flow into such channels if an adequate factor of safety is provided the loaner.

In normal times the credit of commercial banks is more than sufficient to finance agricultural interests. It is only in times of financial stringency, when

sudden deflation occurs and current loans become capital investments that acute distress is evident. The producers of the basic products of the West, of such products as wool, livestock, rice, cotton, and green and dried fruits have so demonstrated their sound standing throughout a period of years that ample justification is offered for the establishment of long time credits to prevent any recurrence of conditions that may have a tendency to retard continuous marketing of western agricultural products.

"Those Whom the Gods Would Destroy They First Make Mad"

"CALL the electrical dealers back to their own business, and do it now," appeals a prominent electrical manufacturer who claims to voice the thoughts of many of his fellows. "The electrical dealer has in the past sixty days," he continues, "spent one hundred per cent of his time attempting to sell radio appliances, and has lost sight of his regular electrical business."

He states that the trade journals and newspapers of the country are somewhat responsible for the actions of a large part of the electrical dealers, who, after many lean months of trade are acting like a thirsty desert traveler suddenly come to an oasis, jeopardizing their business health by an over-indulgence in "radio."

Temperance in all things, like honesty, is the best policy. The dealer who neglects to devote some of his time to selling his regular commodities to the large number of new people which radio is attracting to his store, is undermining the business structure which it has probably taken him years to build.

A farmer who devoted all of his time to currying a race horse, and neglected to feed his draft animals would be counted mad. Yet there are many dealers who are just as foolish. After the radio "wave" has receded the dealer will have to turn again to his stock commodities. The wise dealer of today will capitalize on his crowded store to push his regular lines.

Readjustment of Freight Rates in the Lumber Industry

SOME issues back we called attention editorially to a movement that is now on among the green fruit producers of California to secure a reduction of rates on their products to eastern centers. The lumber industry deserves similar consideration. The substantial increase in freight rates made effective in the summer of 1920 placed western lumber manufacturers at a serious disadvantage as compared with southern pine producers, who, since the development of the timber resources of the West, have been the principal competitors in the eastern market. Freight rates, when adjusted from time to time, have usually been changed in such a way as not to affect seriously existing competitive conditions. This recent sweeping adjustment, however, gave southern pine an advantage of \$2 to \$3 per thousand feet. This is one of the principal reasons why the lumber industry has been in a decidedly depressed condition during the

past year and a half. The railroads, of course, should have sufficient income not only to enable them to operate but also to develop with the growth of the country. However, it is felt that rates should be readjusted so as to put the western lumber manufacturer in an equitable position as compared with his southern competitors. It would seem that a reduction of freight rates is desirable as soon as railway operating costs make such action possible. However, the problem is one which demands serious investigation and consideration, for it would seem that practically every western commodity confronts the same question of increasing transportation costs to eastern market centers. The result is, if our railroads are to live and thrive as they should, the subject of freight readjustment must be considered both from the angle of the operator as well as the shipper.

For a Better Understanding of Our Everyday Problems

WE hear much nowadays about good will. Good will in itself is not sufficient to solve industrial disputes nor to elevate the human race to a higher plane of contentment. A sympathetic understanding of the needs of others is the only basis upon which a permanent cure can be attained. It is impossible to believe that the labor problem in the communities of the West, has been solved, either on the part of the employer or the employee where a full sympathetic understanding has not been arrived at. We are too often inclined to act in the line of least resistance and then attempt to justify our action in our mind. In our daily dealings with the other fellow would it not be better to first assure ourselves that we have a full understanding of his problems, and that we have carefully thought out our own problems before we attempt to bring about industrial peace? Until the men who are the head of the industrial relations activities in the West realize that this course is the only sane one for dealing with their problems, no permanent solution can be hoped for.

"Passing the Buck" Unfairly to the Federal Reserve System

PROBABLY no institution designed for the general welfare of the whole country has been less understood by the public and more misrepresented for political purposes than has the Federal Reserve System. It has been a common practice on the part of country bankers when forced to call a loan to tell the borrower that it has been requested by the Federal Reserve Bank. The attempts on the part of unscrupulous and misinformed politicians in Congress to discredit the System for their own private ends have received sufficient comment in the daily press to exclude further comment here.

The Federal Reserve System which has discounted bank paper at six or six and one-half per cent to help local banks carry the farmer (rate is now $4\frac{1}{2}$ per cent in all Federal Reserve banks except in Kansas City, Minneapolis and Dallas), is blamed

for the high interest rate which the farmer has often had to pay and in which the Federal Reserve System has had no part.

The Federal Reserve System may be improved as time passes but it is unfair and not justified by the facts for country bankers to "pass the buck" to the Federal Reserve System for high interest rates which local banks may establish.

The criticism which has been made of the Federal Reserve authorities for their warnings against bank expansion and for their efforts to control it late in 1919 and early in 1920 by advancing rediscount rates, are particularly unfortunate criticisms. The crisis was inevitable and those who blame the Federal Reserve authorities for it would do better if they would thank the Federal Reserve System for having saved the country from the unspeakable disasters which such follies as those engaged in in 1919 would undoubtedly have brought in the days which preceded the Federal Reserve System.

If a booklet entitled "Better Banking under the Federal Reserve System" now being distributed by member banks of the System, could be read by all of the critics of this system of banking it would in a large measure dispel the misunderstanding about the work which has been done in the last two years, in insuring the financial stability of the country.

It has been truly said that no act in the history of this country since the framing of the constitution itself has done more to insure stability, prosperity and financial strength, than the inception of the Federal Reserve System.

Problems of Production in the Mining Industry

THE scarcity of skilled mine labor and the general inefficiency of labor now prevailing in western mining centers can only be remedied in two ways—first, by a system of instruction for unskilled labor that will increase the ranks of skilled miners and, secondly, by making such improvements in living conditions in the mining field as will attract the more desirable type of labor to this important branch of western industry. In the metal mining districts, particularly in the Intermountain region, two other problems in production—problems involving inventive genius—await solution. One is the need for a flexible and an efficient underground loading device adaptable to the small working places in fissure mines. This may be accomplished by the further development of mechanical devices now in limited use, or by the invention of some entirely new contrivance. The more important problem, however, is the need for the invention of some device which will increase the efficiency of drilling operations and eliminate the dangers from dust. The improvement and wider use of a wet stoping machine accomplishes this to a certain degree, yet mining engineers and operators are unanimous in the conclusion that there is a wide range of opportunity for future inventions in both of these problems.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Reports from labor authorities in all of the western states indicate a marked increase in employment during the past few weeks. Chief among the reasons ascribed is the absorption of workers in agricultural pursuits, steady expansion in building operations, the beginning of highway construction and repair work, and increased activity in many of the lead and copper mines which had heretofore been closed down or operating at reduced capacity, and the opening of lumbering operations. It is to be noted that an apparent reversal has occurred in the character of the demand for labor, the present need, except in a few localities, being for unskilled rather than skilled labor. The general labor situation is probably more favorable than it has been for some months past, although there are several strikes in progress in the larger cities of the West, chiefly involving wage disputes. It is to be noted in most of the industries that wage scales have been adjusted to the prices of commodities and that labor in most cases has shown a willingness to accept reductions.

The predictions of engineers and geologists familiar with the vagaries of the great "Red River of the Southwest," that flood conditions on the lower Colorado River would reach their maximum during the next few months, have hardly been published when word comes that danger has already become very pronounced. Flood waters in the region of the Imperial Valley have already risen to such a point that some apprehension is expressed in the local papers. The seriousness of this situation is apparent when it is noted that the usual flood season does not commence for some weeks. The heaviest fall of snow on record fell during the last winter on the watersheds of the Rocky Mountains where the Colorado rises, and this has not yet begun to melt to any marked degree.

The Colorado River in the vicinity of the Imperial Valley flows along a flat ridge some thirty feet above sea level, and considerably above the Salton Sea and Imperial Valley (which are in places 250 ft. below sea level). The ridge is a silt-formed delta and is very unstable. The river is enclosed in many places by levees and is constantly shifting its channel. The levees which protect the valley have several times been awash, and it has been necessary to raise the levees about a foot a year to keep pace with the rise of the river channel. It is only a mat-

ter of time when the river will break through as in 1905 and discharge into the Salton Sea instead of southward to the Gulf of California, unless measures are immediately taken to control this menace.

The report of the lumber mills of the Inland Empire giving the number of cars shipped during March is the most optimistic issued since the spring of 1920 when production was at its peak.

A total of 4,425 cars of lumber was shipped during the month, almost double the total of March, 1921. The shipments which amounted to 116,550,848 board feet are the highest, with the exception of 1920, since records of the Western Pine Manufacturers' Association were started. The increase of activity is a direct reflection of the building activity which is progressing at an astounding rate all over the country. Prosperity and activity in the lumber industry is undoubtedly responsible in a large measure for the view of the business critic in the Northwest who observes that "A better 'feeling' pervades the business world; sentiment is more cheerful, and increasing confidence that the corner has been turned is more general."

A plan was recently proposed in Seattle which is new in the annals of city government. The proposal which was known as the "Three Cent Fare Bill" and considered the most important question at a city election held on May 2 was overwhelmingly defeated. The bill provided that the cost of operating the street

railways run by the city should be paid out of the revenue, and that the annual installments and interest be paid out of the general tax funds. The present fares are 8 1/3 cents, by tickets, ten cents for a single fare, with special rates for school children. Had the bill passed it is estimated that the fare would have been reduced to three cents, and that city taxes would have been increased approximately seventy per cent.

Business men in Seattle were strongly opposed to the bill, claiming that it would be extremely injurious to the growth of the city and would have halted many industrial projects which are now contemplated. The bill failed to carry in all but ten out of two hundred and ninety-four precincts in the city, being defeated by approximately twenty-five thousand votes out of a total of forty-five thousand votes cast. Whether it is fair for the property owner to support the street railways or not, Seattle has decided to let the passenger pay for his own ride.

Unemployment Being Reduced in Western States

Lumbering Resumes in Northwest

Flood Conditions on the Lower Colorado River

Seattle Three Cent Carfare

The importance of the power industry in the western states in its relation to the number of men employed in construction work is graphically illustrated in the following computation. On the

Labor Used in Building Western Power Plants Kerckhoff and Kern Canyon projects, the two hydroelectric developments most recently completed by the San Joaquin Light and Power Corporation of Fresno, California, the total labor charges on the jobs were divided by the average wage and this figure in turn divided by the number of kilowatts of installed capacity to determine the number of man-days used in installing one kilowatt. On the Kerckhoff job the figure of 9.55 man-days was obtained on an installation of 42,600 kw., while on the Kern Canyon job which was the enlarging of an old project, and presented more difficulties, the figure of 14.90 man-days per kilowatt was obtained on an installation of 10,600 kw. Adding the total man-days on these two jobs and dividing by the total kilowatts of the two installations gives an average of 10.623 man-days per kw. This company assumes a basis of continuous work for 300 days per year. Taking 250,000 kw. per year as the average of water power development on the Pacific Coast in the next ten years, which is a current estimate, and on the basis of 300 days' work per year the 10.62 man-day rate would call for the steady employment of 8,850 men.

Denver, which has been lagging behind in the building boom which is occurring in practically all of the cities of the West has suddenly come forward with a rush, and present indications are

Denver Building Permits Show Large Increase that in the number and value of permits issued, the past month will exceed any other period in the history of the city. Permits which approach a thousand in number and almost two million dollars in value exceed the record of July, 1910, the previous record month. The majority of the buildings listed are residence structures including a large number of brick structures. It is reported that the proposed activity will materially reduce the housing shortage which in Denver, as throughout the country, has been acute.

The advent of the spring season of outdoor work and a belief in the comparative stability of present prices of building materials are apparently the major factors in initiating this building program. The revival of building activity will absorb considerable of the unemployed and have a beneficial effect on trade conditions in the Intermountain city.

The question of a ship subsidy or aid for ships flying the American flag that will enable them to meet foreign competition, which under our own laws as they exist today is virtually impossible, is a question in which every American citizen should interest himself. Particularly is the issue vital to western and Pacific Coast states. Hundreds of millions of people live across the Pacific. Here is the logical market

for our surplus farm and manufactured products. Without American ships to transport our goods to these markets we will always be at a disadvantage in developing this trade. If the inland states could only realize it they have more at stake in the development of an American Merchant Marine than the few coast states which touch our ocean borders. Our inland territory produces the bulk of our farm and manufactured products, any surplus of which above domestic consumption must find outlet through our seaports to foreign lands, hence it is highly essential to the successful growth and development of our inland country that this nation has an efficient merchant marine operating under a national policy which will encourage it in reaching every possible foreign market for the benefit of our home producers.

The idea of a "ship subsidy" has been objectionable to the American people principally because they have failed to understand the problem involved. The cry is raised that a subsidy is for the purpose of enriching ship operators to the detriment of the public.

A ship subsidy is nothing more or less than a form of tariff which will enable American ship operators to maintain American standards of wages and living as provided for American sailors by our laws.

There is nothing iniquitous about the plan. It is just plain business. If the American people understand the issues involved they will not be misled into sanctioning a policy which would deny relief to the American Merchant Marine.

As a matter of fact our own legislation at the present time which discourages the operation of ships under the American flag is a direct subsidy to the foreign ship owner who is not affected by our laws and is thus enabled to compete unfairly with American ships.

If we maintain legislation which offers special advantages to American seamen, we must provide by subsidy or otherwise, measures which will enable American ship operators to meet foreign competition while operating under our shipping laws.

Bond issues which were intended to provide the cities of Santa Ana and Newport, both of California, with municipally owned public utilities, recently failed to carry in each case by overwhelming majorities. Santa Ana voted on whether to include an electric light plant in connection with its water works, and

California Cities Vote Against Municipal Owners Newport was considering the advisability of installing its own gas holders and distributing system. It is to the credit of the voters in both of these cities, where adequate service can and has been supplied by growing industries of the state, and where communities are urged to increase their individual participation in the affairs of these companies by becoming financially interested; that they should recognize the fallacies of the usual arguments for municipal ownership. The preponderance of evidence has always been that greater and more lasting good comes from the proper exercise of private initiative in the handling of large business enterprises.

Letters to the Editor

West Has Ample Facilities for Becoming Iron and Steel Center

To the Editor:

Sir: If I may, I would like to comment upon the discussion opened by Mr. J. W. Beckman in your issue of May 1st, relative to electric smelting of iron ores in California. I believe the same as you and Mr. Beckman, that California and the entire Pacific Coast, has a wonderful potential possibility in the steel industry of the future, due to the super-abundance of hydroelectric energy. From various statisticians we learn that the present supplies of oil and coal, at their present consumption will suffice for the needs of this country for a coming period of approximately twenty-five years. Naturally, as time advances, these supplies will become curtailed and the steel industry must look to some other means of supplying heat, electric energy being the most feasible from every standpoint. When this time arrives there is no doubt in my mind but what electric furnaces will be the universal melting medium, both of iron and steel.

However, at the present time, the electric furnace cannot compete on a strict tonnage basis with either the cupola or the open-hearth, but it is far superior in every way when the question of quality is brought into play. There are, of course, certain installations of electric furnaces where metal is being made cheaper than in the open-hearth, one of these being the furnace at the Southern Pacific shops in Sacramento, but this is due to excellent operating conditions, and is an exception to the general rule. Therefore the question, as I see it, is not to try to build up the coast on a tonnage electric steel basis, but upon the basis of highest quality where we can compete upon all items, including costs.

Swedish iron, it is true, has gained a world wide name for excellence, due to its being used as the base for all Sheffield tool steels. However in this country today are shops specializing on tool steel, making as fine a product as ever came from England, and yet they are not using Swedish iron. This is because they can obtain as melting stock, iron which has been refined in the electric furnace, eliminating phosphorus and sulphur to the same degree as the best Swedish iron, and much cheaper. This refined iron is cast into small ingots and recharged into either crucibles or electric furnaces, and makes excellent tool steel of all kinds. Then, too, conditions in Sweden are much more favorable to cheap production than in this country. Following are some cost statements as made by Mr. H. A. de Fries, who is probably as well informed about Swedish practice as anyone in this country, upon the subject of pig iron production at Domnarfvet, Sweden:

Assumed: Cost of power, \$25 per hp. year. Lump ore or sintered concentrates, \$5 per ton. Crude concentrates, \$4 per ton. Carbon electrodes, \$8 per 100 lb. Lime, \$1.50 per ton. Charcoal, \$12 per ton. Labor, 75c. per hour, 60% iron in charge. Amortization and interest spread over ten years.

ELECTRIC SHAFT FURNACE, 3,000 KVA.

Power.....	2,600 kw-hr.....	\$ 9.10
Ore.....	3,300 lb. @ \$5.....	7.40
Charcoal.....	1,000 lb.....	6.00
Electrodes.....	15 lb.....	1.20
Lime.....	500 lb.....	.37
Labor, operation.....		2.65
" repair gang.....		.40
Furnace repair.....		.10
Miscellaneous power for auxiliaries, etc.....		2.20
General fixed expense.....		3.00
TOTAL.....		\$32.42

Now, if you will compare the above with our prices here for power, lime, charcoal, etc., you will readily see where the cost of manufacture is prohibitive. Yet there are other ar-

ticles to be manufactured in the electric furnace where we may enter into any class of competition. Steel castings, iron castings, high grade forging ingots, alloy steels, special iron castings for electrical and heat resistant use, corrosion proof castings, etc., can all be made in the same furnace using the same class of scrap. Cheap grades of scrap, finding limited uses in other processes, borings, turnings, clippings, etc., make an excellent charge for the basic electric furnace to refine. When it is considered that electric steel at the present time is being made for less than \$30 per ton, in the ladle, and grey iron for about \$25, under California operating conditions, you may readily see what a potential field is opened. There have been times, during the last few years, when electric furnace shops have been shut down, due to power shortage, but I believe this is a thing of the past when the enormous contemplated development is considered, and I look to see the day when steel products "Made in California" will lead the world.

I would like to join with Mr. Beckman in offering my hearty cooperation to anyone interested along these lines.

LARRY J. BARTON,
Metallurgist,
Southern Pacific Company.

Sacramento, Cal.

Central Station Problems Affect the Entire Electrical Industry

To the Editor:

Sir: While the utility industry is overcoming some of the difficulties with which it has contended since the war, there are numerous new and unprecedented problems intruding that will tax the wisdom and ingenuity of every executive before they can be solved or even alleviated. Some of these problems affect the very existence of the utilities, consequently they are fraught with peril for every allied industry. Only by sustained and united effort on the part of all affected will they be overcome. The central station being the arch of the electrical industry, its foundation must not be impaired lest the whole structure tumble.

Every central station is confronted with the necessity of inaugurating extensions and improvements that were deferred during the war period because of the prevailing high cost of labor and material and restricted earnings. When these expansions are commenced they will be reflected in the business of every contractor and dealer in the land.

But there are numerous lofty barriers to surmount. Chief among these is the tax-free security of the government, state, municipality and school district. To finance these much-needed extensions, the utility must sell its bonds in a market that is glutted with this class of paper which, naturally, overshadows the utility bond. Until the government, by constitutional enactment, restricts the tax-exempt security, the utilities will continue to experience much difficulty in financing; consequently, delay in expansions.

Another menace to the utility industry is the growing sentiment in favor of restricting state utility commissions in the exercise of their powers, especially that part which does not operate in favor of the public. In the past, when regulatory bodies were exercising their authority to compel rate reductions, they were hailed as champions of the people. When, because of economic conditions, it became absolutely necessary for the commissions to sanction a small rate increase or a bit more leeway in operating conditions, the people, not realizing what their demands meant, in many instances became incensed and insisted on opposite action, though utility rates never have been increased to the extent of other living costs.

State and municipal ownership germs are now rife in many sections. In casting about for some remedy for the present untoward business and industrial conditions, the public

has directed its attention to the utilities. Failing to realize that in the end they pay far more for politically controlled utility service, the people in various parts of the country are endeavoring to divest private ownership of its holdings. There is a danger that this mood will seize upon the people of this region unless a united front is here to meet it.

Each year sees the taxes of the central station and other utility properties piled higher. State and county taxes in several Colorado localities are draining the very life blood from the companies.

Federal and state legislation, conceived by the politician and agitator, is beginning to rear its head over the horizon. Some of it is aimed directly at the utility, some of it at the regulatory bodies, with a view to crippling them or shearing them of the very authority that has been a mantle of protection for the utility organizations.

Every manufacturer, jobber, dealer and contractor is touched by the problems that it might seem at first glance are confined to the utility companies. The utility organizations are now engaged in combating these problems through publicity and every other known means. They are uniting their efforts. But until every other allied part of the industry realizes that after all the fight of the utility is a battle involving all, there can be no concert of action that will terminate in a peace of prosperity.

GEORGE E. LEWIS,
Executive Manager.

Rocky Mountain Committee on Public Utility Information.
Denver, Colo.

Value of an Old Employee Is Difficult to Compute in Dollars and Cents

To the Editor:

Sir: In these days of modern business we constantly expect expansion, not only of the activities of the institution with which we are identified, but also that greater responsibilities will be the lot of those who guide and supervise the various operations.

The difficulties of conducting a large business do not increase in proportion to the increase of business, but rather the difficulties increase almost as the square of the increase.

The length of service should, in a well-guided business, mean a proportionate increase in the knowledge and skill of the employee. The proper guidance and laying out of the work of the various departments will largely tend to preserve this accumulated and valuable knowledge of the employee.

In almost all cases the duties of employees can be so arranged that as they increase in years of service their accumulated knowledge and experience can be made an asset of the institution rather than a hindrance and ultimate loss.

There comes a time when the individual holds on to details rather than pass the real work and analysis to subordinates. In a growing business a department head must necessarily supervise rather than do the actual work. Sometimes acquisitiveness of information and work comes from lack of confidence in others and again it is the result of a personal desire to keep in on the smallest details. In either case every person concerned is a loser. The proper appreciation of this means that, regardless of age, the valuable experience of a department head is useful to the company during the period of his physical ability to be on the job. This date is greatly extended by this guidance. The placing of responsibility develops initiative and capacity in the individual.

It costs time, money, work and trouble to train new employees. We know what is wrong with our present employees. It is better to try and remedy their defects rather than replace the present force. The new employee has unknown faults which may be greater than those of the present employee, so in nearly all cases it is easier to correct the fault

of the present employee rather than to incur the time, trouble, expense and risk of again making a mistake in selection.

Frequently wage increases are the cause of labor turnover. In many cases it is unfortunate to have an old, trained, satisfactory employee leave the services all for a slight monetary increase. Usually the opportunity for leaving is caused by some other person recognizing the merit of the efforts of the retiring employee. If some other person can afford to pay this increase, usually we can and it is merely our loss.

JOHN F. LAYNG.

Employee Is Important Unit in Utility's Public Relationship Program

To the Editor:

Sir: The financial stringency and high costs of operation generally existing during the past eighteen months, have caused business of every kind to seek new aids for economies not before realized. The hunt has evidenced itself in various ways. In many organizations, betterment for the individual worker, a lower labor turnover, greater individual production, hence lower labor costs, were seen in an emphasis on different workingmen's organizations. Magazines and text books flooded the country telling of the triumphs of industrial democracy and committee control of factories and plants. It is probably a correct statement that these ideas have been given a fair trial. Both employer and employee welcomed and tried out the plans. There has doubtless been a positive return to both sides, yet we hear far less emphasis on this type of industrial organization now than two years ago.

Undoubtedly the concept of the fundamental value of the industrial worker to the enterprise has influenced later industrial organizations. The development of the workman of today into the leader of tomorrow carries with it every desired end of industrial relations. What is the value of ever so perfect a system of employee control, if it does not bring to the individual workman the assurance that his efforts at mastery of the business will bring a sure reward, or bring to the employer the knowledge that this increased responsibility given the workmen in controlling factory conditions will return to him those economies which only a workman can render? Committee systems and so-called industrial democracy will live and render service insofar as they stimulate individual achievement and advancement through the exercise of a sense of individual responsibility for the economic conduct of the business. But perhaps largely because these systems deal with "the men" instead of "the man," and fail to inculcate that attitude of mind on the part of the worker which he would have to exercise if he were to become owner of the business—for these reasons, industry is seeking other aids for developing its leaders and achieving its needed economies.

Whether it comes through ownership of his company's securities, or through an atmosphere of friendly cooperative relations between management and men, or through a fixed policy of the management to fill positions from among the ranks of their own employees, thus ensuring promotion for the man who proves himself faithful and worthy—whatever the agency, certain it is that the employee who goes to his task each day feeling that he has a splendid organization to uphold and serve, an organization which challenges his very best efforts, an organization which on that particular day and in his particular place may be held up to ridicule, except for the efficiency of his own work—that employee will find advancement beckoning in his path, and that company which has thus inspired such service, should find no difficulty with its men or with public sentiment in its community.

A. O. WELLER, Budget Director.

Denver Gas and Electric Light Co.

Builders of the West

EVEN though a man may have a definite aim and may keep his gaze fixed steadily upon it from early youth, it does not always occur that he sees its rich fulfillment in his middle life. Yet such has been the experience of Dr. Gilbert N. Lewis, head of the Chemistry Department of the University of California. Not only this. He is also privileged to witness the wide results of his work and that of his department in the chemical industries of the West and in the enormous impetus given to scientific research. Under his direction the men in his laboratories are making and perfecting discoveries which will affect to an untold degree, chemical engineering and the general field of science.

From a child Gilbert Lewis was driven by the urge of a scientific imagination. It took him at the age of fourteen to the University of Nebraska, where he chose with unerring instinct to devote himself to the study of chemistry. It sent him to Harvard for his post-graduate degrees and later across the water to the Universities of Gottingen and Leipsic. Then we see him, a remarkably young man, in various positions of responsibility; first as Superintendent of Weights and Measures in the Philippine Islands, then as Director of the Research Laboratory of Physical Chemistry at the Institute of Technology, Boston, Massachusetts, and finally in 1910 as head of the Chemistry Department of the University of California. And all this time his intellectual eagerness was satisfying its particular hunger by more daring investigations into the subject of chemistry. Even before he came West he had written several papers on relativity, horrifying by the heresy of his statements of the physicists of this country. Their fears have since been quieted, however, by Einstein. When he was studying for his doctorate at Harvard, he initiated a line of activity which later led to what is called the Third Law of Thermodynamics.

Under his ten years' guidance the growth of the Chemistry Department of the University of California has been a matter of marvel. He began with a three-fold ideal, the teaching of chemical principles,



GILBERT N. LEWIS

Scientist, author, teacher, executive head of the College of Chemistry, University of California, who has given an unparalleled impetus to the growth of chemistry and scientific research in the West.

the training of men for work in industries, and the investigation of scientific problems. This colossal task he has accomplished. He has built up such a teaching staff that its members are constantly sought by other institutions. Three new buildings testify to the widening activities of the department. The graduates of the College of Chemistry are greatly in demand. Scarcely an industry in California but testifies to their excellent work. When he came to this coast six men were engaged in research work here. Now there are eighty. And the growth of this department, now a vital power of the West and one of the greatest scientific centers in the world, has been largely due to the efforts of Dr. Lewis, whose admirable and unusual balance enables him to encourage and pursue scientific research while at the same time he superintends the practical application of scientific

principles. This tireless energy and informing genius has made Dr. Lewis the author of some seventy-five articles and treatises. These same qualities helped him to serve brilliantly in the recent war during which he was commissioned major in the Chemical Warfare Service. His work in France, where he was director of the whole field of gas service, received due recognition, since he was honored by the French Government with the title of Chevalier of the Legion of Honor.

Yet this individual with a career formidable in achievements is a modest person whose enjoyments are as simple as those of the average citizen. He likes to play golf on the Claremont Country Club links. He is interested in reading adventure magazines. But his great desire is to travel. And since his mind moves in large spaces, the fact that he has been to Europe several times, to China, to Japan, is but incidental in his voyaging ambitions. His dreams are of his laboratory.

To Gilbert N. Lewis, then, for the stimulus he is giving to the growth of chemistry in the West and to scientific research throughout the world, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Duties of a Personnel Department in an Industrial Plant

How One Successful Western Industry Has Solved Industrial Problems Among Its Workers by Developing the Scope of Its Personnel Department, a Feature Lacking in Many Other Large Industries

By BRUCE F. BROWN

Superintendent, The Paraffine Companies, Inc.

IN the past few decades great strides have been made in manufacturing and in other branches of industry, and except to a limited extent it is no longer the day of the small shop. It is the day of quantity production with its corresponding accumulation of machinery and large employe lists. The change from the small shop to the present condition has been a rapid one. Some modern plants have passed through progressive steps in reaching their present sizes, others have been built on large scales with existing plants as their models.

In this development many problems have come up and have been solved to a greater or less degree. Many problems remain to be solved and are demanding the attention of the manager and his assistant in their continual efforts to promote efficiency, to decrease waste, to improve quality, and to lessen cost. Other employes can—to a great extent—assist in the solution of these problems. Through their ability and their desire to work in harmony depends the efficiency and morale of their department and of the whole plant. Upon the management falls the responsibility of selecting men capable of development and of providing conditions that will promote harmony. The success of a modern plant can almost be gaged by the degree to which the management has succeeded in solving this particular problem.

Growth of Personnel Departments

The evolution from the small shop to the large plant has changed the relation between the manager and the employe. In many plants which have grown so large that the manager does not know the employe personally, or at least a very few of them, a new department has been formed, called the personnel department—under the charge of the personnel manager. These are new terms in industry and are the direct result of the best efforts of managers to solve that problem of selection of men most suited for the work to be done and of creating conditions that will lead to their advancement and their desire to promote harmony. The proprietor of the small shop worked with his few assistants. He knew them intimately and attended to whatever matters he thought concerned them. He conducted a very simple “personnel department” and the degree to which it benefited the employes depended entirely on his ideas along these lines. As the business grew, the proprietor, or manager, was compelled to spend his time on office duties and delegated the direction of the work in the shop to a foreman—or possibly several foremen. The plant was not so large but that he knew all of the employes and found time to attend to personal matters that came up. He may have retained the selection of employes and

established some direct benefit features and delegated their supervision to an assistant. This was a step forward and still a very simple “personnel department,” but an advance toward the personnel departments as we find them in present day large plants. In these plants—where the number of employes is so large that the manager knows a very few of them—he acts through assistant managers, superintendents and foremen. If he has a smooth running organization, one of his most important assistants is the personnel manager in charge of the personnel department.

Duties of Personnel Manager

The duties of the personnel manager and the work done in his department are not all standardized as between plants, so it is only possible to mention in a loose way typical examples of the work of such a department. When help is wanted the personnel manager is advised of such need and is directed to select parties seeking employment that in his opinion are best fitted for filling the vacant positions. He refers them to the department foreman, who—after an interview—either accepts or rejects them. If they are accepted they are placed on the pay roll through the personnel department and are acquainted with the rules of the plant. All necessary data in connection with group insurance, accidents and the like are recorded. The new employe is made to feel that he is a part of the family of employes and that he is to use the personnel department, and to go to its manager with matters that concern him and his relationship to the company. It is the substitute for the direct contact of proprietor and employe in the small shop. In case help is no longer required in a department, the party concerned is not discharged by the foreman but is turned over to the personnel department, who may have orders from other departments of the plant and can place him. If no employment is to be had in any department, it becomes the duty of the personnel manager to make the discharge.

First aid, safety committees, doctors' service—both at the plant and at home, group insurance, club rooms, recreation grounds, the plant newspaper, night schools, building and loan associations and similar features come under the personnel department and personnel manager, whose aim is to relieve large establishments of that seeming impersonal relationship with its employes and to give them as nearly as possible that personal touch which the manager is unable to give directly. It can be readily seen what a vast amount of assistance a capable personnel manager can be to the general manager, and how necessary is his department to promote that harmony that must exist in any really successful plant.

A Specific Western Example

Ten years ago I was entrusted with the erection of a factory for the manufacture of paper and paper board, and have had the opportunity to give careful consideration to the human factor in industry as it applies to this plant. This careful consideration has resulted in an employe organization that works smoothly, and, aside from the satisfaction it affords, is one of the greatest factors for efficiency and the cutting down of waste. It has received favorable comment from those who have had a chance to observe it. The plant has not reached that stage where it requires a separate personnel department and manager, but has advanced from a small beginning until it is now necessary for one of the office assistants to devote part of each day to personnel matters. The present output is seventy-five tons of paper board daily—as compared with fifteen tons in the beginning.

In working out plans for the plant, in addition to features that would lead to economy in operation from the purely impersonal point, care was given to the selection of a site that offered the largest number of natural advantages. Such items as a sufficient water supply, a waste water outlet, the shortest haul for raw materials and finished products, cheap power and fuel and good homes for the workmen were carefully considered. The buildings were planned with a view to the safety of the workmen, and freedom from fire hazard. Their construction was in keeping with their uses and unnecessary first cost items which would lead to no future savings were kept to a minimum.

Paper is made by a continuous process, on large massive machines, and passes from one part of the machine to another until it is finished. Any interruption affects the whole operation and the machine crews work as a unit with a sequence of authority. The machine tender is foreman of the crew; the backtender is his first assistant; the third hand is under the backtender, and the cutter-tenders and roll-tenders are under the third hand. It is through these various stages of advancement that the trade is learned and there is an incentive to become proficient at each step, to be ready for advancement. Paper mills operate twenty-four hours per day on account of the time required for heating the dryers, getting the paper over the machine, and the waste in stopping and starting.

It was necessary when the plant was first started to import machine-tenders, two back-tenders and two men familiar with making pulp. Engineers, firemen, millwrights, skilled and unskilled laborers were secured locally. Ten years ago practically all paper mills operated on the two-tour system. They have mostly changed to three eight-hour tours. Aside from the departments actually engaged in making pulp and paper, the other departments are the power plant, shop, yard, finishing and shipping, and office. In the small plant at the beginning, I was superintendent over all of the departments and was also foreman over pulp and paper making, the yard

and finishing. The present chief engineer was in charge of the power plant and operator on the day tour. The present assistant superintendent was the office force and shipping clerk while the present master mechanic with a few assistants was in charge of construction and repairs.

In the plant, as it is today, and five times its original size, each of the departments mentioned above is directly under the foreman of that department and responsible to the superintendent. The foremen have all been selected for promotion from their several departments, either during the construction period or later, as it becomes necessary to have them. I believe the loyalty and earnest work of old employes should be recognized and that they will develop into efficient foremen, if the superintendent gives them the teaching and support he should. This recognition of worth has been a great factor for good will and harmony, while the taking of a man from another plant to be a foreman of a department often creates the greatest discord, regardless of his reputation. When the system was changed from two to three hours, a backtender became a machine-tender, a third hand became a backtender, etc. When the size of the plant was increased and other machines were added, the same kind of promotion took place.

Meetings are held from time to time to talk over conditions affecting the several departments and the plant in general. These meetings are attended by all the foremen and the machine-tenders (who are foremen on the two night tours). During the war period these meetings were frequent, as many temporary adjustments had to be made. The question of wages was often discussed and raises in wages were based on the cost of living. Advances were made a number of times. There have been two decreases based on the same standards.

At times factions have arisen and have been settled to the satisfaction of all by a frank consideration of the cause of the trouble and the adjustment of the misunderstanding. At other times it has been necessary to discharge employes who refused to give due consideration to their work or fellow workmen.

Aside from the factor of recognition of worth and corresponding compensation, which I believe is the greatest single factor for creating harmony among employes of any plant, there are many other lesser contributing factors. The payment of wages in full once each week, the arrangement of temporary loans to proven employes in case of urgent need, group insurance (which includes men who are otherwise unable to secure insurance), the assistance in guaranteeing credit to employes purchasing homes, and the arrangement for buying stock in the plant on easy terms, are typical examples.

The application of the principal of recognition of worth, the advancements, and the group and individual benefits that modern industry is able to give when properly applied—and this comes directly under personnel management—will go far to remove the cause for industrial strife.

Comparative Advantages of Unit and Line Drive in Industry

A Discussion of Mechanical Installations in Some Important Western Industrial Plants Tending to Show That the Adoption of Unit or Line Drive Depends Upon the Type of Work to be Done

By H. P. PHILLIPS

Factory Superintendent, Meese and Gottfried Company

TWENTY-FIVE years ago the industrial plant was of necessity designed around its own boiler room. Shape and construction of buildings and location of machinery were made convenient to a main steam-driven shaft, sometimes connected by long belts or rope drives to more distant departments. But in the West today, with an abundance of cheap hydroelectric power, the steam engine has practically disappeared as an isolated prime mover, except in such plants as paper mills, sugar refineries, or saw mills, where steam is necessary for manufacturing purposes or waste is available as fuel. The modern method in such industries, in the larger plants at least, is to generate and distribute power electrically through motors rather than mechanically through engine and line shaft.

It is needless to discuss the advantages of the electric motor drive—its general convenience, adaptability, and reliability are beyond argument. It may be placed in the position most suitable for manufacturing requirements, is easily cared for, clean, safe, and inexpensive to operate. It is, however, a matter of more than ordinary importance to the plant engineer or manager to decide whether the unit system of direct connected motors, or the group drive through line shafting is most suitable to his needs. Each plant and often each machine presents a condition which must be met upon its own grounds. Consideration of the question for a given case must be made with a full knowledge of certain facts: first, the character of the work to be done; second, the cost of installation and operation, and its bearing upon production costs, and, third, the effect upon quality or quantity of output. It is impossible to say which of these will be the deciding factor, but a few practical illustrations of what has been done in other plants may be helpful in deciding upon which method to follow.

Comparative Costs

In the accompanying illustrations, Figure 1 shows a view in the machine shop of the Holt Manufacturing Company, at Stockton, California, with groups of fourteen medium sized lathes machining gas tractor parts. These groups are driven from line shafts approximately one hundred feet in length, carried in ball-bearing hangers, suspended from steel frame supports giving rigid alignment. Ample power for each group is furnished by a 30-hp. motor connected by a silent chain drive. The frictional resistance of these line shafts is very low, it being easily possible for a man to turn the full length complete with belts and countershafts by gripping the shaft with both hands. As the matter of initial investment always requires careful attention, a complete itemization of the first cost of the two systems

of drive is given below, and for closer comparison separate figures are shown for ring-oiling bearings, with belted motor:

LINE SHAFT DRIVE	
With Ring Oiling Bearings and Belted Motor	
100 ft. 2-15/16 in. Shafting	\$ 118.65
4 2-15/16 in. Bolted Flange Couplings.....	76.45
11 2-15/16 in. x 16 in. Ring Oiling Hangers.....	156.75
14 18 in. x 4 in. Pulleys.....	100.50
700 ft. 4 in. Leather Belt.....	504.00
30 ft. 6 in. Motor Belt.....	51.80
1 30 hp. A. C. Motor with Controller.....	362.85
Structural Steel Framework.....	240.00
Wiring, including conduit, etc., to switchboard..	110.00
Millwright, erection	100.00
Total Cost	\$1,821.00

With Ball Bearings and Silent Chain Drive	
100 ft. 2-15/16 in. Shafting.....	\$ 118.65
4 2-15/16 in. Bolted Flange Couplings.....	76.45
11 2-15/16 in. x 16 in. Bearing Hangers.....	420.75
14 18 in. x 4 in. Pulleys.....	100.50
700 ft. 4 in. Leather Belt.....	504.00
1 30 hp. A. C. Motor with Controller.....	362.85
1 Silent Chain Drive.....	150.00
Structural Steel Framework.....	240.00
Wiring, including conduits, etc., to switchboard..	110.00
Millwright, erection	100.00
Total Cost	\$2,183.00

UNIT DRIVE	
10 7½ hp. Motors, with Compensators.....	\$2,003.00
4 5 hp. Motors, with Switches.....	485.20
Wiring, including conduit, etc., to switchboard.....	350.00
Extra switchboard capacity.....	150.00
Application to machines or extra cost of lathes, equipped for motor drives, (approximately).....	2,800.00
Total Cost.....	\$5,788.20

As a concrete example, it may be interesting to analyze the conditions of this particular shop, keeping in mind the three considerations already mentioned, the nature of the work, operating costs, and effect upon output.

The work handled on these machines consists of light castings and forgings, which do not require crane service. Chucking is quickly done in special jigs, and the cutting operations are fast, with frequent stopping and starting of the machines. The lathes have ample belts, and are fitted with quick change gears, permitting as close speed regulation as the work requires. The load factor, that is, the ratio of used to rated horse power, on machines of this class will not run over 25 per cent, so that with 95 hp. in separate motors the power consumption would be greater, due to lower efficiency, than for the single 30-hp. motor operating at nearly full load. Too much importance must not be attached to the possible saving of power in this case, however, as power cost ordinarily constitutes only a small percentage of the cost of the product of a machine shop, and if increased output could be obtained with separate motors, even with greater power consumption, it would be money well spent. These machines in general run on a uniform class of work, with few occasions when excessive power is demanded, and as the work of the shop is on scheduled production, it is likely that any overtime required will be from a



Figure 1.—Machine shop of the Holt Manufacturing Company at Stockton, California, showing group drive through a ball-bearing line shaft, a case where this type of drive is highly economical.



Figure 2.—A line of heavy duty drills in the Holt plant, all having unit drives. The work performed by this battery of machines is such that this type of drive is more flexible and more economical.



Figure 3.—The machine shop of the Alameda Works of the Bethlehem Shipbuilding Corporation illustrates correct shop layout for the character of work to be done. The machines are practically all unit driven.



Figure 4.—A line of centrifugals in the Crockett refinery of the California and Hawaiian Sugar Corporation illustrate a difficult belt drive which is subjected to heavy duty and is costly to maintain.

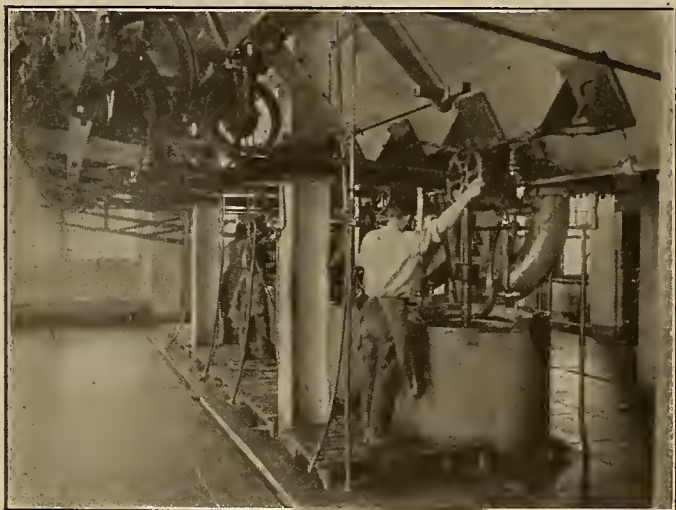


Figure 5.—Another example of belt driven centrifugals at the Crockett refinery operating with a quarter-turn belt. Clutch, brake and belt maintenance are high in this installation.

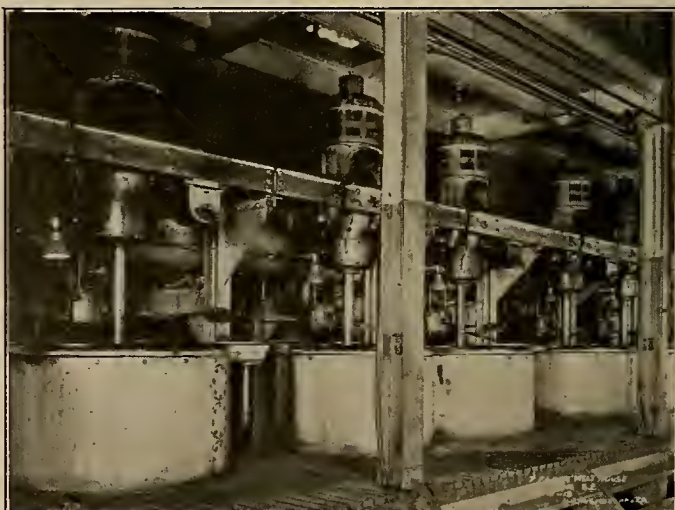


Figure 6.—The latest installation of centrifugals at the Crockett refinery showing the machines direct connected to squirrel cage motors. Easy of control and low operating costs are features of this type.

group and not from a particular machine, consequently, there will be little loss of power due to the motor idling under partial load. The arrangement of machines along the line shaft is excellent for the work handled, and there is no advantage which might be gained from greater flexibility of location. Cost of maintenance of the belted plant will include the upkeep of belting, the occasional filling of ball-bearing housings with grease, and the oiling of countershafts. For the unit driven plant, the repairs and renewals of the more complicated electrical equipment will usually be higher, due to the large number of motors, and high class labor required.

Advantages of One Type

Summarizing, so far as the nature of the work is concerned, there seems to be no particular advantage to be gained from one system of drive over the other. No headroom is required for cranes, the arrangement of machines is satisfactory, speed regulation is simple, and there is no need for great flexibility. In respect to the cost of power and upkeep, the advantage seems in this case to be with the line shaft, especially as there is no apparent necessity for increasing the output by additional power, as the machines are already amply supplied. The problem narrows down to a simple question of first cost, and if the decision is to be made on a strict basis of economy, it would seem that the group drive, through ball-bearing line shafting, is the correct method for this particular case.

Figure 2, taken in the same shop, shows a line of heavy duty drilling machines, each driven by a 10-hp. motor mounted on a structural steel frame, and belted to the clutch pulley at the base of the machine. These tools are built to pull the full cutting edge capacity of a 3-in. high speed drill in steel, and with quick holding fixtures the work is handled very rapidly. Applying the same analysis to this case as to Figure 1, there seems apparently to be no reason why this line of machines could not be driven from a similar set of line shafts, with possibly two 30-hp. motors, instead of sixteen 10-hp. motors as at present. Looking into the matter more closely, there are certain modifying conditions which might give the unit drive the preference for the group. Most of these machines are equipped with special fixtures designed to handle one particular piece of work, and consequently, there are times when some of them will be allowed to stand idle, rather than change the fixtures. This would of course result in a greater power consumption and less flexibility of the group, if the machines were driven from a line shaft. It would be necessary also to set the machines parallel to the shaft, requiring more space, or else operate with quarter-turn belts instead of the present convenient and compact arrangement.

Requirements of Heavy Work

In contrast to the straight production shop, Figure 3 shows the machine shop at the Alameda Works of the Bethlehem Shipbuilding Corporation. The work under the main craneway consists of heavy forgings and castings, parts of ships and marine engines, and the matter of the convenient location of the tools with reference to the handling of ma-

terial is in this case the important point. The time required for setting this heavy class of work in the machines, and for cutting operations, is considerable. Variable speed motors make it possible to take full advantage of the cutting power of the tools, as the changes are conveniently handled by remote control switches and speed controllers directly on the machines. In the side bays under lighter traveling cranes are the smaller boring mills, planers, and drill presses, while in the balconies are the turret lathes, milling machines, and lighter equipment, all motor driven.

Figures 4 and 5 illustrate a very difficult belt drive, a line of centrifugals in the refinery of the California and Hawaiian Sugar Refining Corporation, at Crockett, California. The shaft driving this battery is very heavy, carrying a friction clutch pulley for each machine, and is driven by a 150-hp. motor. Figure 5 shows the quarter-turn belt, passing from the clutch pulley, under the idler, then to the driven pulley on the vertical spindle of the machine, which revolves at 1,100 r. p. m. After the clutch is thrown in, about two minutes are required to reach full speed, which is continued for about three minutes. The clutch is then thrown out, the brake applied, and the machine brought to a slow speed in a short space of time. The service is severe, and the wear and tear on belts excessive.

Quite in contrast, these difficulties have been obviated by the application of vertical direct connected motors, as illustrated in Figure 6. The motors are the ordinary squirrel cage type, with high resistance rotors, giving a high starting torque and rapid acceleration. The controller, within easy reach of the operator, has three positions, one for starting, one for stopping and applying the mechanically operated brake, and a neutral position used only when the unit is not in service. The first cost is higher, but maintenance and upkeep are less than with the belt driven machines. Besides greater ease of control, less complication, and less space required, the motor driven centrifugals have the advantage of greater output and more uniform product, by reason of the quicker starting and stopping.

Neither Type Superior in All Cases

The advantage will usually be found in favor of the group drive in connection with lighter machinery, such as in textile mills, canneries, can factories, etc. Paper making presents a problem in close speed control, and line shaft drives are often advantageous in paper mills. Many other situations might be mentioned to show the advantage of the unit drive in some industries, and without doubt an equal number to prove the case of the group drive in others.

In conclusion, it cannot be said that either the unit drive or the line shaft drive is superior for all industries. In considering the question for a particular case, the best plan to follow is to apply the same careful study as would be used in the selection of any other producing machine, for in the final analysis the purpose of a plant is to produce at a profit, and each part of the equipment must be an effective means to that end.

Uniform Accounting for Municipal and Private Utilities

The Public Is Entitled to Know Whether a Publicly Owned Utility Is Operated as Economically and Efficiently as Some Similar Governmental Unit or Privately Owned Competitor

By PAUL ELIEL

Formerly Director San Francisco Bureau of Governmental Research

WHENEVER a public ownership campaign is contemplated, either for construction, acquisition, or extension of a utility, the arguments of supporters and opponents revolve around questions of relative cost, with occasional comparisons of service rendered. Existing projects publicly owned are attacked or defended with all the assurance that comes from accounting and operating data of unquestioned accuracy. Yet in nine cases out of ten, the accounts of publicly owned utilities are maintained in such a haphazard, deplorable or incomplete fashion that accurate statements are utterly impossible.

When the comparative method is resorted to in such arguments, the situation becomes even more confused. As a rule public and private operating results are contrasted. While such comparisons may be of value, one seldom hears comparisons made between two publicly owned utility projects. To the citizen and taxpayer, to the student of government, to the engineer and accountant, to the investor, such comparisons prove quite as interesting as those more frequently made.

Comparisons between publicly owned projects are but infrequently resorted to, because of the fact that in so many instances the methods of accounting and reporting used are so dissimilar that accurate comparisons are out of the question. The average taxpayer, however, is quite as much interested in knowing whether his publicly owned utility, which is supplying him with light, water or some other service, is operated as economically and efficiently as a similar project operated by some adjacent governmental unit, as he is in learning of the results of this project as compared with some privately owned competitor.

During the initial stages and often for many years following the inauguration of any public utility enterprise, every argument as to success or failure naturally revolves on the question of whether or not the project is actually making a profit. Thus after almost a decade of operation the Municipal Railroad in San Francisco still finds its way to the front page of the papers at not infrequent intervals in regard to this important question. Again, it is doubtful if most of the citizens of Los Angeles know today, or ever will know, at least until all of the Owens River bonds have been retired, whether the Los Angeles aqueduct system is actually a paying enterprise, or whether it is an extremely costly undertaking. Convinced they are of its value from an economic standpoint, and they have little objection to raise against it because of the rates charged, but many of them undoubtedly do not know that a great

part of the burden of fixed charges has for many years been carried on the general tax rate.

Laxity of Municipal Accountants

There are many items vital to the sound consideration of any utility enterprise, which are all too frequently entirely omitted from discussion of projects publicly owned. These questions concern themselves with such matters as the actual investment in the property, the depreciation suffered by the property during the course of time, other accrued charges and credits, and the value of the interdepartmental services frequently rendered to the publicly owned utility without cost to it.

While the last of these items may assume considerable importance and might in certain instances constitute the difference between financial success and a very real loss, it is on the first items that the chief importance should be placed, and it is in connection with the proper handling of these items that a uniform system of accounting, for both publicly and privately owned utilities would render the maximum of service.

The failure to develop accepted accounting practices on public enterprises, is due in no small degree to the fundamental difference in the point of view of officials in charge of the construction of publicly owned and privately owned projects. Since the privately owned project must, if it is to justify itself, earn a return upon its cost, proper and complete accounting for all of the elements involved is of vital interest to officers and owners. In a publicly owned project, on the other hand, the dominating influence is always that of the engineer. The accounting facilities and the accounting knowledge of most public officials is abysmally deficient. Asset and liability, and revenue and expenditure accounting is to them a totally unnecessary refinement. Cash is what they are interested in. If the accounting officials of a city are certain that the money expended for a municipally owned utility is honestly spent, they care little about the fine points of accounting distribution and terminology.

The Engineer's Viewpoint

The engineer, during construction at least, takes much the same position. He is concerned principally with questions of cash costs by divisions of work, and comparative bare unit costs on comparable classes of construction, usually without any loading for overhead expense.

The true accountant, on the other hand, if he is to obtain through his books a clear and accurate picture of any project as expressed in dollars and cents, is interested primarily in such matters as the total investment segregated into directly productive units and into units which can be properly handled

when the matter of depreciation must be considered. As already pointed out the municipal accountant is as a rule a total stranger to such refined accounting principles. In consequence, he usually accepts the engineer's point of view because it is the easier way, and important and fundamental data are set up on a basis which makes subsequent accounting control if not impossible, at least a very difficult matter.

Some California Examples

A few examples will possibly make more clear the vital importance of a uniform accounting system for both publicly and privately owned utilities. The City of Pasadena has for many years operated both a water plant and an electric light plant. At all times its officials have made a most consistent and thorough effort to keep citizens accurately informed as to the real financial situation in regard to both these projects. Certainly no city in California has gone further in the publication of detailed reports with readily understandable explanatory statements for the benefit of its citizens. For many years, however, the reports of the water department were presented on a basis which to one familiar with accounting principles, raised serious question as to the accuracy of the statement. For instance, no item was ever included for accrued bond interest. This was handled as a cash transaction. Nor did the liability side of the balance sheet contain any reference to accounts payable, nor was any reserve set up for contingent liabilities on account of outstanding purchase orders. Similarly a reserve was carried for bond redemption, and enough was annually credited to this amount to retire the first year's bonds when they fell due for payment. But in no place in the report did a statement appear indicating that the result of the first five years of operating would merely place a sufficient sum in this reserve to retire the first year's bonds and that thereafter either the extension and maintenance program would have to be seriously limited or redemption carried upon the tax rate.

Pasadena was always very accurate and as scientific as possible in connection with accruing its depreciation charges. On this water system which was carried several years ago as a total investment of approximately a million and a half dollars, they charged about \$55,000 annually to depreciation. The City of San Diego, on the other hand, never felt called upon to make such careful and precise statements. A general operating statement and an extremely elementary balance sheet, were the sum total of San Diego's explanatory matter as to their water supply project. The interesting point in this connection, however, is that San Diego on a system carried on the books at about seven million dollars, charged annually to depreciation about \$80,000 as compared with Pasadena's \$55,000 for a million and a half dollar project. Because of the fragmentary nature of the San Diego report, it was impossible to know whether the depreciation was ample, on what basis it was accrued, and in fact any of the details necessary to reach a sound judgment. Inspecting the statements of the two cities, one would naturally feel that the Pasadena statement was more accurate

and that it was reasonable to assume that San Diego was not charging a sufficient sum to depreciation. To the citizen of San Diego, however, examining only the elementary statements issued by his Water Department, would undoubtedly come the thought that since depreciation was shown at all, it must undoubtedly be soundly carried.

In connection with the Municipal Railroad of San Francisco it has been customary to set aside fourteen per cent of the gross operating revenue to cover depreciation. The reasons for establishing the depreciation on a percentage basis are not pertinent to this discussion, but the fact remains that since that time, on numerous occasions, questions have arisen as to the adequacy or inadequacy of this amount.

Another example of the dangers of improper accounting in a publicly owned project comes to mind in connection with the Hetch Hetchy project. The cost of construction of this project is carried according to the engineer's primary interests, namely the cost by physical divisions of the work. Classification of these costs by functional operating units is not shown, nor is any effort made to separate that portion of the investment properly chargeable to water from that portion properly chargeable to the power enterprise. It is doubtful whether under any circumstances it will be possible to segregate these items at some time in the future in order to allocate the income and expense of the system when it becomes an actual going concern, and it is doubtful whether it will be possible to accurately set up the proper depreciation charges on the various elements comprising this enormous undertaking.

The Logical Remedy

Even though real thought and effort has been expended on the accounting practices of a publicly owned utility, much of the value of this work is lost because of the variation between these accounts and those of utilities now handling their accounts under the uniform classification provided by the Railroad Commission.

If space were available a number of other instances could be alluded to which would merely serve to reinforce the argument for the necessity of a uniform system of accounting for both publicly and privately owned utilities. It is only through such a medium and by such means that the citizen taxpayer can be protected in the expenditure of the capital funds which he supplies; that he can secure reliable and accurate information as to operating costs, and that he can compare the results of operations, not only on his publicly owned project, but also with other utilities publicly and privately owned. If public officials will not assume the responsibility of providing accurate and uniform information in regard to the expenditure of funds of which they are stewards and trustees, as well as the results of operation of properties under their control, then the interests of the citizen-stockholders demand that publicly owned utilities conform in their accounting practices to the principles laid down by the Railroad Commission for privately operated companies.

Some Important Recent Developments in Western Water Law

A Discussion of the Cases Handed Down By the Supreme Courts of the Western States During the Past Fifteen Months Which Have an Important Bearing Upon the Power Company, Irrigationist and Industrial Plant

By A. E. CHANDLER
San Francisco

FROM the farmer whose crops depend upon the life-giving fluid which flows from the irrigation ditch upon his land, from the power company, the wheels of whose generators are set in motion by this same water, to the industrial plant which is dependent both upon the power to operate its machinery and the water for its manufacturing processes, the question of water rights and water law is of prime importance. Mines, factories, lumber mills, irrigation districts, municipalities, central stations—all of these may be vitally affected by a single judicial interpretation of the existing laws. The following notes represent the most recent developments involving water rights. They are restricted to those cases decided by the supreme courts of the western states during the past fifteen months, which present new legal points.

CITY OF SAN BERNARDINO VS. CITY OF RIVERSIDE, (Supreme Court of California) 198 Pacific Reporter 784. (Decided June 3, 1921.)

This case is one of the most important of the cases of recent years dealing with underground waters. As the water supply of two municipalities was involved, the case was presented with great care. The findings in the case prepared by the lower court cover three hundred pages in the printed transcript, thus indicating the amount of technical evidence which was introduced. The opinion is valuable not only for its statement of new points involved, but likewise for its summary of established principles regarding the diversion and use of percolating waters. On account of the claims made by owners of land overlying percolating waters in regard to probable injury resulting from storage of surface waters, the subject of rights in percolating waters is becoming of more and more interest to power companies engaged in storage.

Part of the opinion dealing with the definition of "surplus" waters is so important from the engineering standpoint that it is given herein in full. The lower court had defined "surplus" water as follows:

"The word 'surplus' used in this judgment means, and for all purposes of this judgment shall be deemed to mean, that condition of the San Bernardino artesian basin which exists when the average annual feed to the basin or water crop, that is, all water which rightfully and properly reaches and replenishes the basin, exceeds, for any year or period of years, the aggregate of all the artificial rightful drafts, together with all the natural drafts, made on said basin during the same period; and a 'deficiency,' as that word is used in this judgment, exists during such times as there is not a surplus, as herein defined."

In commenting upon this, the Supreme Court says:

"We are of the opinion that the aforesaid definition of the word 'surplus' prescribes an impractical and unworkable plan for the determination of the question, whether there is or is not a surplus. The court must first ascertain 'the average annual feed' to the basin from water 'rightfully and properly' reaching it and 'replenishing' it, for any year or period of years. This obviously refers to the 'average annual' rainfall on the watershed, and to the part thereof which reaches and replenishes the basin. The findings show the difficulties attending this inquiry. The annual rainfall has varied from 37.51 inches in 1883-84 to 7.49 inches in 1898-99. The average annual rainfall at San Bernardino from July 1, 1871, to July 1, 1916, was 16.2 inches per year. From 1893-94 to 1899-1900, the yearly average was only 11.09 inches. The water which sinks into the debris cones and percolates under

ground toward the outlet moves at the rate of only 2 miles in a year, and it is several years before it reaches the points where Warm creek rises, and where the wells of the parties are located. Hence neither the rain of a wet year nor the decrease in a dry year becomes manifest in the water level at Warm creek and at the wells in question for several years afterward.

"There are no practical means of ascertaining the total annual rainfall on the watershed. No records are kept, except in San Bernardino and a few other places. We may judicially take knowledge that the amount varies greatly in different parts of the watershed; that in the high mountains it will usually greatly exceed the fall in the basin; that cloudbursts may occur in one of the canyons when there is a mere sprinkle in other parts of the range, and that, even in a general storm, the rain may be heavy at one place and light in others without any cause except the course of the winds, the conformation of the mountains, and the like, and that a slight change in the direction of the wind will materially affect the rainfall in the different places affected. During the period from 1881 to 1916, the rainfall at San Bernardino was 16.41 inches, and that at Riverside 11.02 inches. The two cities are about 20 miles apart, on the same general plateau, and with about one hundred feet difference in elevation. To ascertain with even approximate accuracy the rainfall on the entire watershed for any year a large number of additional daily records must be kept, and great expense must be incurred therefor.

"The actual increase to the waters of the basin in any one year cannot be measured by the rainfall for that year. During a heavy general rain a large proportion of the precipitation flows down from the canyons in the channels of the surface streams and through the outlet of the basin without ever sinking below the surface. It is impossible to measure these flood waters. Such a flood may constitute the major portion of the seasonal rainfall. In another season the rains may come more regularly and evenly but in the same quantity, so that a very large portion of it sinks into the basin, and none runs off. In the drier seasons the rain may practically all evaporate, and none of the waters thereof reach the basin. The amount of such evaporation cannot be measured. It will vary from time to time, according to the humidity or aridity of the atmosphere, and the amount of sunshine.

"From these facts, all of which appear in the findings, it is apparent that the first factor in the computation of the surplus, the amount of water rightfully and properly reaching the basin, cannot be ascertained."

The entire opinion is summarized by the court as follows:

"The briefs contain 1,700 printed pages, and they discuss many minor points which we have not noticed. We do not consider them essential to any of the points we have decided, nor necessary for the guidance of the trial court in future proceedings. Our conclusions upon the more important questions may be summarized as follows:

(a) With respect to the waters taken from the artesian basin for public use, each party stands in the character of an appropriator, and its rights therein are to be determined by the law relating to appropriators, and are not to be measured either by the law regarding riparian rights or by the law concerning the rights of the landowner in water underlying his land.

(b) In this action the court should not undertake to provide for the future apportionment of the waters of the artesian basin or for the ascertainment of a surplus or deficiency, but should confine itself to the adjudication of the existing rights and priorities of the parties to the action in the waters involved. The judgment should state the quantity of water to which each party is entitled, and should not leave such quantity indefinite or dependent on future needs, events, or conditions.

(c) The judgment should not make any declaration of the right of any party to take in the future any water to which it has no present right.

(d) The plaintiff is not substituted to nor entitled to use the water or water rights of the owners of land within its limits unless it has acquired such right directly or indirectly from such landowners, and then only for use on the particular land of such owner.

(e) The measure of a water right acquired by taking and using the water extends only to the quantity actually theretofore applied to beneficial uses, and includes no right to take additional water in the future."

TOWN OF ANTIOCH VS. WILLIAMS IRRIGATION DISTRICT, (Supreme Court of California). Decided March 23, 1922.

(The following comment is taken from the opinion as reported in *The Recorder* of March 28, 1922.)

The Antioch case is noteworthy as it deals with conditions very different from those presented in the ordinary water right controversy. The Town of Antioch is situated on the San Joaquin River, a few miles above Suisan Bay. The San Joaquin River is connected by two sloughs with the Sacramento River. The town initiated proceedings to enjoin twenty-seven defendants from diverting water from the Sacramento River above the City of Sacramento. The claim of the town was that prior to the diversions by said defendants, it was able to take water from the San Joaquin River uncontaminated by the salt water from the bay, but that since the diversions of the defendants were initiated, and especially in the dry year of 1919, said diversions had so decreased the natural flow of the Sacramento that the salt water of Suisan Bay was brought on the tides to Antioch, and thus contaminated its water supply.

The town based its superior claim upon its riparian right as a municipality and likewise upon its prior appropriation. The lower court held that a town could not base a riparian right upon the mere fact that it was situated upon a stream. It held, however, that its right by appropriation was sufficient upon which to base an order enjoining the defendants "from diverting so much water from the Sacramento River and its tributaries, to non-riparian land, that the amount of water flowing past the city of Sacramento, in the County of Sacramento, State of California, shall be less than 3,500 cubic feet per second." As the town claimed the right to divert only .77 cubic feet per second, the order of the lower court necessitated an allowance of water four thousand times the diversion by the town.

The opinion now under comment was handed down on re-hearing. The original opinion was delivered on Sept. 13, 1921, and is reported in 62 Cal. Dec. 321. The present opinion is practically the same as the original opinion with the addition of comments disposing of certain Texas cases called to the attention of the court at the time of the re-argument.

The rehearing seems to have been granted on account of the showing of those interested in delta lands. A great number of delta land owners intervened in the case but did not ask for a temporary restraining order, which alone was before the Supreme Court for consideration.

The Supreme Court disposes of the contention that the city is entitled to riparian rights as follows:

"The fact that the city of Antioch is situated upon the San Joaquin River is wholly immaterial in the consideration of its rights in this case. The rights in a stream or body of water which attach to land because it abuts thereon are not of a political nature, but are private rights. They are vested exclusively and only in the owner of the abutting land and they extend only to the use of the water upon the abutting land and none other. There are cases in some of the eastern states which, upon somewhat strained reasoning, have held that a municipality whose boundaries extend to a stream of water has some rights by reason of that situation, to apply the water of the stream to public uses within the city, rights similar in nature to that of a riparian proprietor to use the water of such stream upon his land. We need not go into the discussion of the soundness of the reasoning of those cases. The litigation which has arisen in this state from the doctrine of riparian rights has been of great volume and it is suffi-

cient to warn us that we should not extend the doctrine so as to make it political and confer upon cities abutting on a stream, but owning no land abutting thereon. Such cases are contrary to the common law doctrine as settled in this state whereby such rights are confined exclusively to the owner of the abutting land and are wholly of a private nature. The status of the city of Antioch in this action, therefore, and its rights in the San Joaquin River are those of a diverter and user of the water thereof for beneficial purposes, and nothing more. (*San Bernardino vs. Riverside*, 198 Pac. 787, clauses 1, 3, 9 and 10a.)"

The following paragraph clearly states the conclusion of the court in reversing the order of the lower court:

"Our conclusion is that an appropriator of fresh water from one of these streams at a point near its outlet to the sea, does not, by such appropriation, acquire the right to insist that subsequent appropriators above shall leave enough water flowing in the stream to hold the salt water of the incoming tides below his point of diversion. Further than this we need not go."

HOLMES VS. NAY, (California Supreme Court) 199 Pac. 325. (Decided June 16, 1921.)

SAN JOAQUIN AND KINGS RIVER CANAL AND IRRIGATION CO. VS. WORSWICK, (California Supreme Court) 203 Pac. Rep. 999. (Decided January 4, 1922.)

In 1901, the Supreme Court of California, in *Cave vs. Tyler*, 133 Cal. 566, held that in order to secure the benefits of the Congressional Act of July 26, 1866, the appropriation had to be made upon government land. Regardless of the opinion in the *Cave* case, there seems to have been a general acceptance of the rule that the rights of the appropriator are superior to those of the riparian owner where the former had initiated his appropriation while the riparian land in question was unentered public land. This statement of the rule was based on the thought that the act of 1866 was practically a waiver of the riparian rights of the government in favor of appropriations made upon the stream, and that, therefore, it made no difference whether the appropriation was made upon public land or upon private land. The *Nay* case and the *Worswick* case, here under comment, reaffirmed the rule laid down in *Cave vs. Tyler*.

As most power projects are upon public lands, the two opinions will have but little bearing upon them. For those projects, however, which were initiated by appropriation upon private land, the opinions are of great moment as the entry of public lands above such diversions will give the entryman riparian rights superior to the appropriation by the power company.

In the *Worswick* case, plaintiff also sought to have the Desert Land Act of March 3, 1877 construed as a waiver of all riparian rights in public lands unentered as of that date. The Supreme Court of Oregon, in *Hough vs. Porter*, 98 Pac. 1083, had so held. The Supreme Court of California, however, refused to follow the Oregon court. In passing, it is noteworthy to state that the Supreme Court of the United States, in *Boquillas Cattle Co. vs. Curtis*, 213 U. S. 339, referred to the Oregon decision as one rendered on plausible grounds, but as the *Curtis* case dealt with Arizona conditions, it was not necessary for the Supreme Court of the United States to pass upon the question of riparian rights.

COOK VS. EVANS, (Supreme Court of South Dakota) 185 Northwestern Reporter 262. (Decided November 10, 1921.)

The noteworthy feature of this case is that the Supreme Court of South Dakota, in passing upon the provisions of the Desert Land Act, reached the same conclusion as did the Oregon Supreme Court in *Hough vs. Porter* (referred to in commenting upon the *Worswick* case). The conclusion is thus stated by the Court:

"We are called upon to decide for the first time the effect of the Act of March 3, 1877. Reading that act in connection with the previous acts of Congress in relation to

public lands, we are of the opinion, as held in *Hough vs. Porter*, 51 Or. 318, 95 Pac. 732, 98 Pac. 1083, 102 Pac. 728, that by said act, Congress did sever from all public lands not then lawfully entered upon, all rights to the use of the waters adjacent thereto except the riparian rights to use such waters for domestic purposes; and that the government, by said act, did dedicate to the public, and thus render subject to appropriation in accordance with existing or future laws and customs, for irrigation, mining, manufacturing, and other proper purposes, all remaining public waters. The reasoning in the opinion in *Hough vs. Porter*, supra, is so lucid and convincing that we feel justified in resting our ruling thereon without referring to other authorities except those cited in such opinion. Unless, upon further hearing of this case, it shall be found that some of those who are claiming riparian rights to the waters of Spearfish creek made their entries after February 28, 1877, and prior to March 3, 1877, all questions of riparian rights to the waters of this stream will be removed from this case."

METTLER VS. AMES REALTY CO., (Supreme Court of Montana) 201 Pac. 702. (Decided October 24, 1921.)

Text writers in listing the western states which have abrogated the riparian doctrine have placed Montana in the doubtful list. By its opinion in the *Mettler* case, however, the Supreme Court of Montana has placed that state among those following the doctrine of prior appropriation only. The opinion splendidly presents the arguments in favor of the abrogation of the riparian right and concludes as follows:

"It is submitted that the policy established by the measures above is irreconcilable with the application of the doctrine of riparian rights even in the modified form in which that doctrine now prevails in the states adhering to the California rule; that our Constitution and statutes proceed upon the theory that artificial irrigation is absolutely necessary to the successful cultivation of large areas of land within the state; that the doctrine of appropriation was born of the necessities of this state and its people; and that it was intended to be permanent in its character, exclusive in its operation, and to fix the status of water rights in this commonwealth.

"Our conclusion is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865; that it is unsuited to the conditions here; and that the complaint in this action does not state facts sufficient to entitle the plaintiff to relief."

HORNE VS. UTAH OIL REFINING CO., (Supreme Court of Utah) 202 Pac. Reporter 815. (Decided October 8, 1921.)

With the exception of California and probably Washington, all of the western states have continued to recognize the common law rule regarding the use of percolating waters. In the *Horne* case, the Supreme Court of Utah has followed California in establishing the "correlative rule." The words of the Court are:

"As a prelude to this phase of the case, we refer to the conflicting doctrines of the old common law, one to the effect that he who owns the soil owns it to the lowest depth, and the other that he who owns soil owns the percolating waters therein, and may use the same as he pleases, even though he thereby diverts and appropriates water percolating in the land of an adjacent proprietor. The two doctrines are in hopeless conflict, and utterly incompatible one with the other. This, perhaps, has had more to do than anything else in evolving what is now known as the American doctrine—the doctrine of reasonable use. This doctrine recognizes the correlative rights of adjacent landowners to the underground waters percolating in and through their respective tracts of land."

The conclusion of the court follows:

"In view of the contention usually made by those who insist that the doctrine of correlative rights is inconsistent with the maxim, *cujus est solum, etc.*, I am constrained to make the further observation that the doctrine of correlative right, in my opinion, is far more consistent with the maxim referred to than is the doctrine that he who owns the soil not only owns the percolating water therein, but also can deprive an adjoining proprietor of a similar right by diverting the water from his land and successfully defend the wrong on

the grounds that it is *damnum absque injuria*. Indeed, it seems to me that the doctrine of correlative rights or reasonable use is the nearest approach that can be made towards a literal application of the maxim, *cujus est solum, etc.*, as far as underground percolating water is concerned.

"The best considered modern authorities seem to be overwhelmingly in favor of the doctrine of correlative rights in cases of this kind. For this reason, as well as upon a careful consideration of the equities of the case, the court is of the opinion that plaintiffs' complaint states a cause of action for equitable relief, and that defendant's general demurrer thereto was properly overruled."

TULARE WATER COMPANY VS. STATE WATER COMMISSION, (Supreme Court of California) 202 Pac. 874. (Decided December 12, 1921.)

The Water Commission Act of California may be divided into three distinct divisions. Sections 11 to 23 inclusive deal with the acquisition of rights by appropriation. Sections 24 to 36 inclusive deal with the determination of existing rights by appropriation. Sections 37 to 37E inclusive deal with the distribution of water among those entitled to its use as shown by the determination of existing rights.

In general the Water Commission Act closely follows statutes of similar intent in other states. Under the Water Commission Act the appropriation of water is now initiated by application to the Commission, just as in other states it is initiated by application to a commission or to the state engineer, as the office in most western states is called.

The Commission is given authority to reject applications, and in states other than California the statute provides that an appeal will lie from action by the Commission to the Courts. The California statute is silent on this point, but it was the practice of the original Commission to consider that an appeal would lie from its action upon an application to the Courts. The question was raised for the first time when the State Water Commission rejected the application of the Tulare Water Company on the ground that water reached the proposed point of diversion at such infrequent intervals as to make the project not feasible. The Tulare Water Company, after the rejection of the application, instituted a proceeding in mandamus before the Superior Court of the City and County of San Francisco to compel the approval of the application and the granting of a permit thereunder. As this was the first case in which a writ of mandate was sought, the attorney for the Commission very properly sought a determination of the question as to whether a writ of mandate would lie against the Commission. The Superior Court of the City and County of San Francisco held that the writ could not be issued against the Commission, but the Court of Appeal and the Supreme Court of the State held to the contrary.

The closing paragraphs of the opinion of the Supreme Court are as follows:

"These citations are at least sufficient authority for holding in the matter before us that the trial court was in error in sustaining the demurrer to the petition for writ of mandate. All the allegations of the petition must be taken as true on demurrer, and such petition alleged all the facts required to entitle the petitioners to the relief demanded.

"The judgment is reversed as to the proceeding for writ of mandate, with direction to the trial court to overrule the demurrer and hear the cause on the merits."

It is clear from the above that the opinion simply holds that the Tulare Water Company is entitled to have the rejection of its application heard in the Superior Court on its merits. The opinion, therefore, places the California Water Commission (now the Division of Water Rights of the Department of Public Works) upon the same basis as similar offices in other states, that is, that one aggrieved by the action of the Commission upon an application may have the matter heard in the regular courts upon its merits.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management and Advertising, University of Washington

THE BUYER OF THE GOODS

Under the guidance of the writer several of his students recently conducted some investigations into certain characteristics of modern advertising. One of these showed that over 94 per cent of display advertising in a given date's issues of twelve general magazines were illustrated, being devoted primarily to so-called short-circuit appeals, and that only 45 per cent carried so-called reason-why copy which in the case of the illustrated advertisements occupied practically always a subordinate position.

Dr. Kitson, Professor of Psychology in Indiana University, ably expresses the reason for this by stating: "In fact, in many sales where reason is involved it plays only a secondary role. The buyer bases his decision chiefly upon feeling. Then, because he likes to regard himself as a hard-headed man who must be 'shown' he tries to justify his decision by reason. He uses it as a sop to his rationalizing conscience. Experienced salesmen have discovered this fact about human nature, and they often use 'reasonable' arguments principally as a means of justifying the choice which they know the buyer has already implicitly made through feeling."

But if this is the case, and if, as seems to be proven by unbiased investigation and experience, reason is the least important element in buying, what then are the motives which impel people to buy and to exercise their choice when buying?

In a broad way, the buying motives of the public at large have three sources, inheritances from a line of previous generations; traditions and established usages of the social group or class to which the buyer belongs; and individual habits formed during his own lifetime. The first of these we shall discuss in the present article.

Instinctive Motives

To recount here the probable origin of instincts in man would lead us much too far afield. Suffice to state that from the standpoint agreed upon by leading exponents of modern, so-called behaviorist, psychology, an instinctive act of man is explained and defined as a complicated act of an hereditary nature, having a definite end or purpose, although the man himself may not be conscious of this purpose, and accompanied by a characteristic feeling or emotion.

The question of instincts has received the most intense study within the last two decades. Professor Thorndyke of Columbia University has expressed their part in man's life most concisely and most

definitely by stating: "The behavior of man in his family, in business, in the state, in religion, and in every other affair of life, is rooted in his unlearned original equipment of instincts and capacities."

All customs and habits of people are only superstructures erected on the broad foundation of these instincts.

But on the other hand, our instincts, like guns and bombs, do not "go off by themselves"—something must touch them off, as it were. And in the case of selling it is the salesman's appeal that touches them off if the salesman has studied the fine art of appealing.

The earliest instincts of man must have been about as primitive and simple as those of the higher animals. But with the growing complexity of human society and social interrelation the instincts themselves became gradually more and more complex, until today they are so overlaid by later modifications, additions and accretions that it is frequently next to impossible to trace their modern forms back to their origins in the past.

The Three Basic Purposes

The life of earliest man was so simple that his interests were entirely absorbed by three basic purposes of his existence, to feed himself; to defend himself, alone or in groups, against dangers and enemies; and to reproduce his kind by raising a family.

With these three basic purposes fully dominating all his actions man began to develop variations of these main themes. And those of the variations which proved, by the hard trial of the survival of the fittest and destruction of the less fitted, to be the best adaptations to the changing surroundings and conditions of life, gradually became in turn converted into instinctive actions. In this way a rapidly increasing number of secondary instincts came to be established in human nature, whose purposes were less direct, less crude, less crass than the original three purposes had been.

And, of course, it is with these secondary or derivative instincts that the salesman of today has to operate in practically all cases.

Instincts Derived from Nutrition Process

The eternally present grinding pangs of hunger had developed in man at an early stage of his career an instinct of greed and of acquisitiveness, to collect and to possess, first food products, then other material things which could be stored up and used or enjoyed later on, and finally all kinds of knowledge

and skill which might prove handy and useful in the everlasting, never relenting struggle for food and more food. This very honorable and ancient instinct of man is still ever-present in him today and is utilized to very great advantage by a number of salespeople. Book agents, coin and stamp vendors, salesmen of various "antiques," etc., all play on this instinct of acquisitiveness and of possession.

Who among you has not used the sales trick of insinuatingly telling the customer, "Now, Mr. Johns, will this machine (or lamp or what-not) not look nice in your home (or shop or office), and will you not feel proud that you own it?" Of course, all of you have done so, but probably without being aware in the majority of cases that you were appealing to one of the most elementary and powerful instincts of man. If you were to realize fully what potent mainsprings of human action you were releasing or trying to release you would probably cultivate this appeal more carefully and would use it frequently and in a much more systematic way.

When you appeal to peoples' desire for profit or gain and when you talk of saving and thrift to them, you are trying to approach their psychology via the same short route of stimulating instincts derived from and associated with the basic instinct of hoarding and nutrition, represented so well in the animal world by the actions of the squirrel saving and hoarding its collection of nuts laboriously acquired against the proverbial rainy day.

I spoke above of the acquisition of skill. Observe how primitive and irresistible are our common instinct of workmanship, our desire to produce things or to "make wheels go round." From the youngster who picks his first Ingersoll watch to pieces and then attempts to re-assemble it, to the automobile owner who buys more and still more "improvements" for his pet car, we all are proud of our skill with things mechanical. Use the knowledge of this common instinct of the male half of mankind, appeal to this instinct, sell to this instinctive buying motive, and you will have once more the assistance of one of these powerful psychological genii, the basic power of the nutrition instinct.

Individual Self-Protection

Pugnacity and rivalry are today's surviving traces of the once so essential instinct of self-protection. The struggle against the ferocious animals of the jungle has long ago given precedence to the struggle against our fellow man, against our competitor.

Sports and athletics, military display and eternal training into fit condition through the apparently innocent means of games played for the sake of playing, these instinctive activities, our instinctive love for these occupations, are all based upon or closely related to the problem of individual self-defense.

But our instinct of self-protection carries us also in an entirely different direction. Appeal to a man's desire to protect himself against bodily danger or to protect his health, and your sales appeal will touch one of the most powerful, because fundamental, motives of the buyer. You can spend an hour of the

most convincing reasoning on him and never attain the results which a brief but skilled appeal to this instinct will produce.

The Social Instinct

The weaker animals always live in packs, having discovered through the process of survival of the fittest the value of cooperative self-defense. And man, being a relatively weak animal, inherited this valuable experience in the form of an inborn social instinct of living and acting in crowds, gangs, groups, classes, nations, tribes, etc.

And with reference to the special work of the salesman this social instinct in man leads to two apparently opposite but in fact closely related tendencies among prospective buyers.

First, there is the instinctive tendency in each of us to be leader of our gang, of our group or class. Watch your women folk impressing the neighbors with a new set of curtains the like of which the neighborhood has never seen.

And, second, we all possess an acutely developed instinct of group discipline, of subordination to leaders, of lining up with the rest of the "bunch."

That tendency to "belong," to do the accepted, proper thing; the pride of class and the religiously faithful observance of group customs; the instinctive desire to be no worse than your neighbor, to do what he does and to have what he has, this all is generally well known even to the amateur salesman who tells Mrs. Jones that she should have a vacuum cleaner because Mrs. Smith has one.

Family and Home Instincts

With mighty few exceptions man is a family loving animal, and the reproductive instincts in him have an early tendency to concentrate his efforts on the founding and up-keep of a good home with a good wife or husband and plenty of healthy and happy children.

Just look at the preponderating number of advertisements in a present-day general magazine built around these ideas of home life and of the beauty, the health and the protection of children, and you will have to admit that the men who spend millions upon millions of dollars upon these advertisements must be rather sure that they are appealing to buying motives of the most powerful character when they appeal to our instinctive love of home and of our children.

It may seem trivial to many of you, convinced as you may be that you have the best, the most economical, the most effective electric washing machine to sell, when you are urged by advertising men and by professional teachers of salesmanship alike to stress the "home and children" points infinitely more than all the other talking points together. But think over what I have just said about the tremendous amounts of money wagered by national advertisers upon the correctness of this idea, and see whether this proof alone will not have a tendency to make you shape your selling appeals to a more efficient utilization of this tremendously powerful all-pervading and ever-present human instinct developed to such particular strength among the people of this country.

Eliminating the Waste in Industry

Shortcuts in Management and New Power Applications Which Have Been Adopted in Western Industrial Plants for Eliminating Waste, Increasing Production and Cutting the Cost of Manufacturing Processes

By LOUIS F. LEUREY
Industrial Electrical Engineer

Electric Drive Avoids Standby Boiler Service for Pump

The Union Sugar Company at Betteravia, California, operates a 1,200-ton sugar beet factory which is in operation for approximately 100 consecutive days of each year, generally during the months of August, September, and October. For the remaining nine months of the year the factory is closed with only repair work going on, but with a large amount of agricultural work to be taken care of in connection with the surrounding acreage.

During the active campaign of sugar production a large quantity of steam, approximating 3,000 boiler hp., is required for carrying on the process. During this period steam required for office heating, and in the operation of a fire pump or other auxiliaries can be produced at a very low cost.

This company, in order to maintain its personnel of trained mechanics for the active campaign and to take care of its agricultural interests, has had to build quite a village together with a club house, a general store, and central office building in addition to the factory buildings proper. For the fire protection of this village and of the main buildings, a standard steam Underwriter's fire pump was installed near the factory and arranged to pump from the main water supply. In addition to this, the steam was supplied to the club house and to the central office for heating purposes.

THIS DEPARTMENT

will be devoted to a discussion of the various problems of waste in industry as they affect western industrial plants. Readers are asked to aid in the solution of the most vital problems facing industry by sending in accounts and pictures of the various practices for combating waste, which have been adopted in plants with which they are familiar. It is only by thus co-operating with Mr. Leurey that the fullest service can be rendered. Space rates will be paid for all material which is published.

During the active campaign, this installation was maintained at a very nominal cost and with high fuel economy due to the large usage of steam by the factory proper. However, during the remaining nine months of the year the characteristics changed entirely and it was found necessary to operate one 100-hp. boiler during the entire nine months for the purpose of maintaining standby steam to the fire pump and a small amount of steam necessary for the club house and office heating. Upon careful analysis it developed that this cost approximated \$1,800 per month, and the only reason it was allowed to continue for a number of seasons was due to the fact that a duplicate source of electric energy was not originally available.

When it was found by careful investigation that an electric source of supply could be obtained entirely dependable, a motor-driven fire pump was installed, to replace the steam pump, and small low pressure boilers fired with natural gas were installed for the small amount of heating required. The total cost of this installation was approximately \$7,000.

The electric energy for the fire pump motor consisted only of the standby charge of \$75 per month and the total operating costs, including all investment charges, did not exceed \$200 per month, leaving a net saving for each month of \$1,600, or a total saving for the nine slack months of \$14,400.

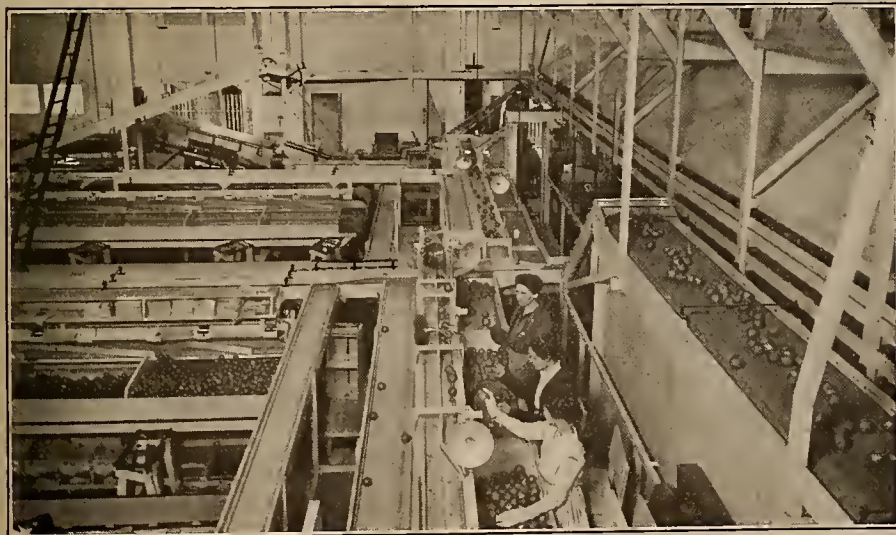
The above instance is not a comparison of relative values of motor driven versus steam driven fire pumps, but is used to show the very substantial saving which can be effected by motor driven pumps in plants where the steam supply is not continuous throughout the year, but in which fire protection must be maintained continuously.

Advanced System of First Aid Is Life and Labor Saver

Under the direction of the United States Bureau of Mines, there is now being given throughout the country a series of practical demonstrations of the use of a simplified and improved first aid bandage which when its use becomes general will prove not only a great saver of human life, but an enormous saver in the labor wastage now going on due to men receiving improper first aid and thereby endangering life or greatly increasing the period of convalescence.

This system, as demonstrated by the Bureau of Mines, consists of two elements—first a simple square pad of sterilized gauze attached to a strip of gauze for tying purposes. This is carried in a sealed sterilized package until it is placed adjacent to the wound itself. The second item consists of a triangular piece of cloth made of simple cotton duck, or in an emergency, fabricated from the shirt of the injured man. The purpose of this second piece of cloth is two-fold, first and primarily to hold the sterilized bandage properly in place, and, secondly, to prevent dust, cold air, and contaminating foreign matter from coming in contact with the inner bandage and the area surrounding the wound.

The writer witnessed a demonstration of this method to a group of twenty linemen working for the Pacific Gas and Electric Company, at Modesto, California, and in a remarkably short period of time not only did the demonstrator himself bandage quickly and expertly every type of wound, including foot,



MATERIAL HANDLING MACHINERY CUTS LABOR COST

In few industries has material handling machinery been developed to the extent it has in the fruit packing plants of California. In this plant of the California Fruit Growers' Association an elaborate system has been worked out which substantially reduces labor costs.

ankle, kneecap, hand, elbow and head, but every lineman in the group was able to secure results almost as good as witnessed in the original demonstration.

The whole thing has been worked out in such a manner that with these two simple elements of sterilized gauze with a tie string and a triangular outer bandage, any type of wound can be adequately bandaged and the patient delivered to the nearest hospital in a condition as good as when the wound occurred.

It is a well known fact, attested by all physicians, that more injury than good is done to many patients by crude and clumsy bandaging, and it often results in additional weeks of time before the patient recovers from the shock, and starvation produced in the wounded member due to improper bandaging.

In parallel with this demonstration simple directions are given for stoppage of blood flow and the proper care of the patient so that the condition of shock can be reduced to the minimum and no hindrance placed on nature's own repairs.

The first evidence of the practicability of this system was the extraordinary interest exhibited by the linemen at Modesto. Not only did they bandage all of the typical wounds shown by the demonstrator, but demanded that he show what could be done in special cases that had actually occurred in their own experience.

No broader and more constructive work is being done in the country today than work of this character which enables the men themselves, such as linemen, flume tenders and other men who have to bear the brunt of risky and hazardous work in remote locations, to give first aid to their injured in a manner almost as good as could be done if a member of the medical profession was in attendance.

Bushel Measurement Causes Waste in Grain Trade

Time Lost in Sperry Flour Mills Cited as Argument in Favor of Substitution of Cental for Present System

Prior to the late war period when the Federal Food Administration was organized to administer the control of wheat throughout the country, there had been two general systems used in the sale and accounting of wheat. In the state of California wheat was bought and sold by the hundred weight. On the other hand, outside of California the general practice was to buy and sell wheat by the bushel.

The bushel measure is an inheritance from the days when volumetric measurement was a practical necessity, due to lack of weighing systems and the general use of wagon transportation. With the natural evolution of the grain trade and the coming of rail transport, the bushel which had originally been a measure of volume was conventionalized into a measure of weight, and this weight was fixed at 60 pounds for No. 1 wheat, regardless of the condition of the wheat.

With the advent of the Federal Food Administration which required a uniform system throughout the country with all mills reporting to federal district representatives, and these in turn reporting to Washington, it became necessary to introduce the bushel method of buying and selling and accounting wheat in California.

In a recent conversation with the chief clerk of the Sperry Flour Company mills at Vallejo, California, the writer learned from an interesting experiment just what this item of introducing the bushel in the wheat accounting has done to increase the waste existing in industry. Following the forms which were printed during the period of the Federal Food Administra-

tion, it became necessary to convert the total accounting of wheat involved in any invoice to the bushel basis. However, when the item of freight entered, it had to be figured at 100 pounds and in turn had to be converted to the bushel measurement to arrive at the total cost of delivery. Furthermore, during the period of the Federal Food Administration, a definite allowance of 4.4 bushels of wheat was set in the manufacture of a barrel of flour, which, of course, is exactly the same as allowing 264 pounds of wheat to the barrel.

In order to tie in with this system, mills having automatic scales had to arrange them to dump as a rule at the rate of one bushel per operation, this, in turn, again necessitating the use of further calculations in carrying the factor back to pounds.

By actual check it took the chief clerk twenty minutes to perform a certain number of calculations figured on the bushel basis which only required six minutes when figured by the direct method of 100 pounds.

If the time lost, due to the introduction of the unnecessary factor were considered for the entire country, it would undoubtedly assume extremely large proportions and is of sufficient importance to merit the direct attention of the Secretary of Commerce.

The milling trade has already gone on record as favoring the use of the cental or 100-pound package as the basis for flour packing, with all other sizes of packages in decimal proportions to this unit. The greatest complication in the simplification of the system of accounting of wheat and in the packing of flour on the cental system is the difficulty which manufacturing agencies have in trying to get together all of the interested parties necessary to make such a far reaching move. It is here where the Department of Commerce could step in and perform for the manufacturers and the country a service which probably can not or will not be performed by any other agency.

The question of the standardization of weights and measures is not one which can be properly accomplished by either the manufacturers themselves or the associations which serve them. It is a question which requires the concerted action of all concerned with the change and one which can only be settled by national agreement.

In settling upon the matter of the cental, it would be equally ridiculous and wasteful for the millers to adopt it as a standard while the farmers and grain brokers insisted upon the bushel. Similarly there would be nothing gained if the grain trade of California, Oregon and Washington used the more simple measurement while the bushel continued to be the standard in the Middle West.

There are no complications in the elimination of the bushel factor from the operation of the grain trade as would exist for instance in an attempt to introduce the metric system, because in the case of the bushel factor the only change would be from considering wheat in units of 60 pounds to considering wheat in units of 100 pounds.



PROPER ILLUMINATION NECESSARY FOR EFFICIENCY

By the use of vapor proof fixtures safety is achieved in the packing room of the Sperry Flour Company Mill at Ogden, Utah, and by the high quality of illumination labor efficiency is increased, personal safety promoted, and cleanliness eliminates the spoilage of the product.

Western Dealer, Jobber and Agent

Business building suggestions for the store — Distribution and warehousing methods — Advertising and sales promotion ideas

Intensified Selling Gets Big Results in Denver

Denver Gas and Electric Light Company Sells 300 Washing Machines and Fifty Ironers in One Month's Campaign

That intensified selling gets results in time of buying depression is reflected in the campaign recently conducted by the Denver Gas and Electric Light Company. The month of March was devoted to the sale of laundry equipment and it resulted in the sale of about 300 washing machines and fifty ironers of different types.

Although voluntary buying was at a minimum after the holidays and the movement of all appliances was exceedingly low, Clare N. Stannard, then commercial manager of the company, started his sales representatives on a drive which had its culmination in the March campaign where intensive advertising, team competition and special prizes "got action" to a surprisingly satisfactory degree.

George Williams, head of the washing and ironing machine department, served as Stannard's first lieutenant in the drive. He conducted daily meetings of the entire sales organization where helpful suggestions were given to the representatives, along with educational talks on the washing of clothes. He personally sold over a score of machines off the sales floor of the central station during the campaign.

The advertising included special newspaper displays, bill boards, personally addressed and signed letters, and attractive stickers in two colors for distribution with the bills to the 50,000 central station customers. Small wooden clothes lifts were given away after interested

people filled out a card telling what electrical equipment each used.

The sixteen residence representatives were divided into two teams, the "Mossbacks" and the "Greenhorns," significant of their being either old or new members of the sales organization. Basing their sales on a system of points, a weekly prize of \$25.00 was given to the representative selling the most machines during the preceding seven-day period. Prizes of \$100, \$50 and \$25 were also provided as special rewards to the representatives making the three highest sales in numbers of machines during the month.

Unusual interest was manifested in a moving window display. Because of its novelty, hundreds of people stopped and watched the comparison in washing by the old and new ways. An emaciated, fatigued figure was draped over an old-fashioned wash tub and through some mechanical adaptation went through all the back-breaking movements.

On the opposite side of the window was a figure, neatly dressed and of charming appearance, reposing in a luxurious chair which rocked, while at her side the electric washing machine was doing the work by the new way. An ironing machine completed the equipment in the window.

Other progressive electrical merchandisers in Denver immediately felt the effect of the drive with the result that their sales of washing and ironing machines also increased materially.

Northwest Develops New Aspects of Cooperative Advertising

By W. D. MORIARTY
Northwest Electrical Service League

The Northwest Electrical Service League has developed three aspects of cooperative advertising in its work in Oregon and Washington which might serve as points of interest in other fields. First of all it has developed a method of utilizing monthly bills of the power companies for carrying the message of the contractor-dealer and for almost forcing the contractor-dealer to pay something for cooperative advertising.

The specific plan adopted has been to send out wiring plans showing the uses of convenience outlets and to place on the backs of these wiring plans cooperative advertising for the dealers of a whole section instead of merely for the dealers of one town. This gives weight to the advertisement in the minds of those who receive the material and the wiring plan tends to cause the material to be kept for reference.

A second phase of cooperative advertising is the gathering together for dinner and a meeting afterward of all the people in the industry. Too often people do not recognize that the wireman is considered by a distinct majority of the people in any town as a much more reliable authority than his employer. When a wireman enters a house to do work it is assumed by the people in that house that he is not concerned with telling them anything except the truth and that they can be more sure of getting the truth from questioning the wireman, who has nothing to sell, than from questioning his employer. The electrical industry must recognize that everybody connected with that industry, and especially the wives of the wiremen as well as the wiremen, have an advertising value in their daily conversations that ought to be utilized. Evening meetings to which all connected with the industry and their wives are invited tend to develop this genuine spirit of cooperation.

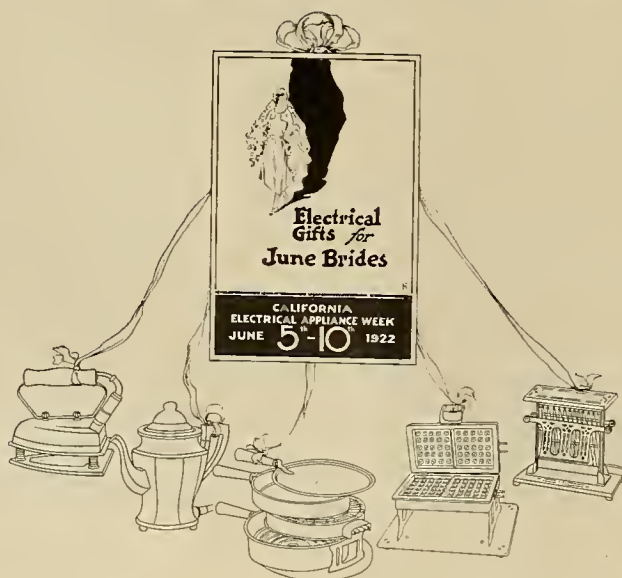
Both in Oregon and Washington the secretary of the local Contractor-Dealers' Association sends in to the central office of the Northwest Electrical Service League the names of all to whom building permits have been issued and the central office in turn sends to the owners copies of the wiring plans. It is true that when the building permit is issued the builder has already in mind about the type of wiring he intends to put in the house, but it is also true that it is possible for him to change these plans at any time before plastering. When properly followed up by the local contractor-dealers who are asked to bid on the wiring this forms a basis for selling the owner the type of electrical installation he ought to have.



The window display used by the Denver Gas and Electric Light Company in connection with a sales campaign which disposed of 300 washing machines and fifty ironers in one month.



Through special arrangement, Glenn Arbogast, owner of the Los Angeles store of the Newbery Electric Corporation, had this window decorated to show the possibilities in a June Bride Week display. The colored poster makes an effective background for the tastefully grouped appliances. Two of the five slogans are also used to good advantage. All of the display literature is furnished by the Cooperative Campaign.



This is the window display suggested for June Bride Week. The five printed slogans can also be used. Cuts of the poster will be furnished for use in advertising copy. Copy suggestions have also been prepared. All of this material is ready for distribution from the campaign headquarters.



June Bride Week Furnishes Merchandising Idea

California Electrical Cooperative Campaign Perfects Plans For Capitalizing upon Age-old Idea of June Bride

Successful merchandising depends largely upon seizing new opportunities when they present themselves and utilizing them to the best advantage. Any event or idea which can be incorporated into a campaign to attract public attention to your goods, stimulate interest and crystallize this interest into the desire to purchase is of inestimable value to the man who sells his goods by direct appeal to the public.

The California Electrical Cooperative League has perfected a merchandising campaign which is based upon such an idea and which promises to dispose of no less than one million dollars' worth of electrical appliances during one week in June. Plans have been decided upon to aid the retail merchants in California in an endeavor to direct toward electrical merchandise much of the buying which is always done at this time for wedding gifts. An attempt will be made to create a bigger demand for "Electrical Gifts for the June Bride." Nor will the activity stop at that point. It is estimated that there will be more than six thousand marriages in California during the month of June, indicating that there must be furnished or built at least five thousand new homes. Emphasis will be laid upon proper electrification of these new homes during the coming campaign.

The week of June 5 to 10 has been set as June Bride Week in the industry. During that period every department of the electrical industry in California as well as all retail agencies engaged in the distribution of electrical appliances will be asked to cooperate in directing toward electrical merchandise the enormous purchasing power incident to June marriages.

Through the agency of the cooperative campaign a fund of \$3,000 has been raised from among the central stations, manufacturers, jobbers and retailers which will be used to finance the campaign. Most elaborate plans have been worked out to cover every district of the state. Posters, window displays, advertisements and the like have been drawn up and will be distributed previous to the opening of the campaign. A director has been retained who is devoting all of his time to the campaign.

Forty-five power companies with 250 district offices serving 780,000 electrical consumers, will aid in the campaign by placing an attractive colored poster stamp on the back of all correspondence during June Bride Week. The district offices of these power companies will also act as the distributing headquarters for all of the free literature which has been prepared for the dealers and retailers. Under the plan which has been perfected for the campaign, a circular letter explaining its purposes will be sent to all dealers in electrical apparatus, whether they be included in the regular channel of electrical distribution or not. This will include all hardware stores, furniture stores and department stores which handle electrical appliances. It is felt that through the participation of such retailers, the benefits to be derived from the campaign will be doubled as will the num-

ber of window displays, advertisements and the like.

In addition to the letters which will be sent out from the headquarters of the California Electrical Cooperative Campaign, manufacturers' representatives and jobbers' salesmen have been instructed to explain the campaign in detail to the retailers in every district which they cover. Previous to the campaign, central station representatives will be sent out from each of the many district offices to canvass the territory, visiting all electrical contractor-dealer establishments, all hardware, furniture and department stores in each district for the purpose of ascertaining the extent to which each will cooperate in the campaign. Orders will be taken by these representatives for display material, literature, posters and newspaper cuts, all of which will be furnished free of charge from the campaign headquarters.

This campaign material includes:

Window Posters.—A 16 x 23 in. poster has been designed in colors around the idea "Electrical Gifts for June Brides" which is to be used as the basis of window trims.

Poster Stamps.—The window poster has been reproduced on stamps 1½ by 2½ in. to be attached to the backs of all letters sent out during the campaign.

Newspaper Cuts.—One column newspaper cuts of the poster have been made to be used as the basis of newspaper advertisements. These will be furnished free of charge. Larger cuts of any desired size will be furnished at actual cost.

Window Trims.—A set of five slogans applicable to the campaign have been printed to be used in decorating windows.

An intensive newspaper campaign participated in by manufacturers, jobbers, central stations and others will be opened on June 4 to continue throughout the week.

Electrical clubs and leagues in all of the large cities of the state will cooperate in making the campaign a success. Every one of the 21,000 people engaged in the electrical industry in California will be asked to exert their tremendous force in making June Bride Week one of the most successful sales weeks that has ever been held.

The merchandising possibilities of the campaign are unlimited. California will entertain more guests during June than any other month in its history so that the effects of the campaign will extend outside of the state and be of benefit to the entire electrical industry.

EDITOR'S NOTE

The Journal of Electricity and Western Industry wishes to receive window displays from all parts of the state in connection with the campaign for reproduction. Dealers sending in photographs of their stores following the campaign will have them reproduced on these pages.

Wired Furniture Will Aid in the Sale of Convenience Outlets

By REY E. CHATFIELD

Secretary-Manager, Electric Service League of British Columbia

Successful merchants today recognize the value of catering to the woman's trade. Perhaps some feel that this idea is overworked, but the electrical contractor-dealer must recognize the influence of the housewife upon plans of the prospective home builder.

Heretofore the argument for the installation of convenience outlets has been based upon utility and convenience.

With charming inconsistency the feminine member of the firm of Mr. and Mrs. Home-builder may argue—"John, we have always screwed our toaster cord and our iron cord in the lighting fixture. I believe we can get along without one of those things in the base board. It's no trouble at all and Mamma has used electric things that way for years—and besides, John, I believe they must be horribly expensive."

When the male member of the firm hears this argument, in all probability he discards the convenience outlet idea and is only sold convenience outlets after much effort on the part of the contractor-dealer. Sometimes, such concessions as the male member of the firm may make are made grudgingly.

The shrewd electrical contractor-dealer will find that wired furniture will materially aid in sale of a proper installation convenience outlets.

Cooperate with a local furniture manufacturer or dealer and have him install bracket lights on the side mirrors of a dressing table or on the bureau—a frosted globe or a shaded lamp on a bracket light, finished to match the dressing table, will attract attention; first, because of the beauty it adds to the finish of the furniture, and secondly, because it brings the illumination at exactly the proper point on the mirror.

Sell the idea of the beauty of light upon the mirror and the general attractiveness of the scheme as part of the decorative plan of the new home. With the idea of the wired furniture for the bedroom sold it is easy to explain the advantage of wiring a dining room table for the use of appliances. Mrs. Home-builder will readily understand the convenience of attaching the electric appliances which she uses on the dining room table to an outlet which is conveniently located at her side. With a wired dining room table three or even four appliances can be used on the table without difficulty.

With the idea of wired furniture firmly implanted in the mind of Mrs. Home-builder it is very easy to explain the necessity of a convenience outlet to which a cord from the dressing table must be attached in order that the bracket lights may be used.

The contractor-dealer now has an entering wedge for the sale of a proper wiring installation. The single item of a bracket light attached to the dressing table may alter the entire illumination scheme in the mind of Mr. and Mrs. Home-builder, and the contractor-dealer having sold an original idea will have little difficulty in selling a proper installation which will be more than satisfactory to his customer; make a profit for himself and build a reputation as an expert in home illumination.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

Denver Home Sets a Record

Visitors to First Electrical Home in Intermountain City Average 1000 Daily

Nearly 30,000 people have already visited the first electrical home in Denver, according to a report received from the Electrical Cooperative League of that city under whose auspices the home was financed and is now being exhibited.

Averaging better than a thousand visitors a day, attendance at the home is understood to have been very gratifying to the League officers. The total attendance is expected to establish a new high mark for electrical home exhibition.

Although the week of May 15th was devoted to music as the annual community music week, good attendance was secured at the home in spite of competitive attractions, according to S. W. Bishop, the League manager, who arranged some electrical musical features for the entertainment of the crowds while waiting.

The saxophone band of the Denver Gas and Electric Light Company gave several concerts at the house, under the direction of Guy B. Hopkins.

What is said to be one of the most novel features of the exhibition is a revolving sign, motored and projected by 110-volt current, which has been placed in front of the house to tell a story in about 150 words about the nature and objects of the house, also to welcome the visitors. It is said to have held the people in line and to have proven thoroughly entertaining.

The exhibition of the home will close June 4.

Plants of Ontario Hydroelectric Commission Seriously Damaged

Damage to the extent of several million dollars was recently caused to the Niagara Falls plant of the Ontario Power Company when two 20,000-hp. generators were destroyed and four 16,000-hp. units placed out of commission as the result of a short circuit on the lines of the Ontario Hydroelectric Commission. In view of the discussion relative to the Canadian project raised during the discussion of the proposed \$500,000,000 Water and Power Act in California, the details of the accident are particularly pertinent.

Generator units fifteen and sixteen, installed by the Hydroelectric Power Commission during the wartime power shortage at a cost in excess of \$3,500,000, were completely destroyed, a portion of one generator flying through the roof of the plant, causing this to collapse and smash the casings of the two turbines. Before the Johnson valves



Looking down upon the wing of the plant of the Ontario Power Company which was constructed by the Hydroelectric Power Commission, showing the damage which resulted when two 20,000-hp. generators flew to pieces. The loss incurred was several million dollars.

could be closed water had flowed into the adjacent wing of the plant and flooded four large generators, placing them out of commission.

Some doubt has been expressed as to whether the commission will replace the units inasmuch as it is under obligation to remove the temporary wooden stave pipeline by 1923 and can use the water to better advantage in the new Queenston plant.

Owing to the loss of power, the plants of the Toronto Power Company and the Canadian Niagara Falls Power Company, were forced to full capacity in order to supply the commission with the requisite energy. A few days previous to the accident one of the new 55,000-hp. units in the Cippawa Queenston plant was forced to shut down when several blades in the ventilating fan dropped off and became wedged between the rotor and the winding, injuring fifteen coils. During a period of less than a week the commission lost completely 40,000 hp. and temporarily 119,000 hp. due to accidents.

Railway to Install Radio Sets on Trains in Northwest

E. A. Lalk, district freight and passenger agent of the Chicago, Milwaukee and St. Paul Railway, has been notified that the Olympian, the company's daily limited train, will shortly be equipped with radio telephone receiving apparatus, so that travelers enroute can receive the broadcasted concerts and news of the districts through which they are passing. Agent Lalk asserts the Milwaukee line has the distinction of installing the first radio telephone equipment used on a passenger train; the installation being made on a parlor car running between St. Paul and Chicago. He states that the company expects to install them on all overland parlor cars as rapidly as possible.

Lumber Production Normal

Pacific Northwest Mills Set New High Record for Eight Hour Shift for 1922

For the first time in more than two years, lumber mills affiliated with the West Coast Lumbermen's Association, smashed all recent production records in the week ending May 6, attaining that long-looked-for normal in the lumber business. The new record cut was two per cent above the normal production of the mills, figured on an eight-hour basis.

At the present time many mills are now running night shifts to keep up with the demand for lumber. The lumber cut for the week, ending May 6, was 84,570,028 ft., or more than 3,500,000 ft. larger than the cut for the previous week, which was the largest since the boom days of 1919 and early part of 1920. The sales for the week were 95,915,471 ft., and shipments were 83,773,137 ft. About 68 per cent of the new business was taken for shipment by rail, which is significant of the remarkable revival of the market for Pacific Northwest lumber in the farming states of the Middle West.

Railroad Company Announces Plan to Spend \$3,000,000 in Idaho

Definite assurances of the immediate beginning of the expenditure of three million dollars on additions and improvements of the Oregon Short Line system in Idaho, have been given by H. M. Adams, vice-president of the Union Pacific, following a conference with Governor Davis at Boise.

The first and most important work will begin immediately, the official stated, in Elmore county where more than a million dollars will be expended in double tracking the main line from Medbury to King Hill through Glenns Ferry.

At Pocatello there will be four hundred fifty thousand dollars spent on the shops. Nampa will get additional trackage, improvement of the water system and ice storage facilities. Payette, Soda Springs, Idaho Falls and other points are included in the cities to receive a share of the expenditure.

Recent reports from New York City contain the information that negotiations have been completed between the Federal Telegraph Company of San Francisco and the Radio Corporation of America, whereby the eastern firm will aid the San Francisco concern in financing the latter's radio contracts with the Chinese government.

Deal for Los Angeles Transmission Lines Closed

Southern California Edison Company Receives \$12,044,369 from City for Entire Distribution System in Municipality

For a consideration of \$12,044,369.97 paid in cash, the execution of a contract by which the city agrees to purchase at wholesale all of the electric power which is not generated from its aqueduct, and a resolution adopted by its council, stipulating "that the city will not support or lend its encouragement to any movement or measure which seeks to supplant the company by some other agency, as the source from which it is purchasing its requirements for wholesale power over and above its own production," and that the city will not enter into competition with the company's electrical business in territory outside of its corporate limits, Los Angeles took over by purchase the distributing properties of the Southern California Edison Company, which lie within its boundaries, on Tuesday, May 16th.

All operating and clerical employees of the company in Los Angeles went over to the city temporarily with the transfer, and the exchange of ownership was effected without an interruption of service or accounting. Some of the company's men are loaned to the city until all details, incident to a business supplying electric service to 120,000 city consumers, are well in hand by the city power bureau. Many of the Edison people will probably remain with the city permanently.

The power purchase contract is for thirty years but contains a provision that it may be cancelled at the expiration of ten years, but only by a vote of the people.

Explaining this contract between the city and the Edison company, W. B. Mathews, special counsel for the Los Angeles Public Service Department, made the following statement:

"The contract provides that the Edison company has first right to purchase any surplus power generated by the municipal plants, in addition to the amount needed to operate the city's system.

"The transaction consummated has the effect of bringing the city and the Edison company together in a power enterprise of the first magnitude. The interest of the city and the company under the purchase contract are largely mutual. It should redound greatly to the advantage of each party.

"It is indeed a fortunate circumstance that the Edison company is largely officered and controlled by men prominently identified with the business life of Los Angeles and deeply interested in the welfare of the city. This fact greatly facilitated the progress of negotiations resulting in the sale and transfer to the city of the Edison system.

"The city's growth makes it certain it will be for many years a heavy purchaser of power from the company, for distribution to the people of Los Angeles."

Speaking of the transaction, Vice-president and General Manager Ballard of the Edison company said:

"With the taking over by the city of Los Angeles of the Southern California Edison Company's distributing properties located within the city, there terminated in mutual pledges of co-operation a most vexing economic problem. Calm judgment on the part of the city and company officials has resulted in the best possible arrangement that could be arrived at under the mandate of the people, that the municipality itself distribute the valuable electric product of the aqueduct to consumers within the city.

"The \$12,044,369.97 we received from the sale of our distributing properties will become part of the \$22,500,000 appropriation which we have made for this year's development and transmission of power in the high Sierras."

Southern Sierras Power Co. Sets New Agricultural Rate

A reduction of agricultural rates of the Southern Sierras Power Company, operating in Riverside and San Bernardino counties was ordered by the California Railroad Commission today effective on meter readings of May 1. The reduction for the average operation, it is estimated, will amount to as much as 20 per cent, while the general average reduction for agricultural service on the entire system is computed to be approximately 5 per cent. The new rates will benefit all agricultural consumers receiving service at 2200 volts or over and also those receiving service at 220 or 440 volts whose consumption exceeds 500 kw-hr. a year. There will be no change in rates for those using less than 500 kw-hr. a year.

In addition to the reduction ordered the form of rate has been changed to the advantage of consumers. The company is directed to replace the present demand and energy rate with an energy form of rate with a minimum charge in which both the energy charges and the minimum charges are based upon the annual consumption. The new schedule also contains an optional demand and energy rate in which both the demand and energy charges are based on annual consumption. This new schedule also contains a provision to the effect that if any consumer at the end of the year finds that any of the optional schedules would have been more advantageous to him the com-

pany will have to adjust his bills to this lower schedule.

The minimum or demand charges have been made payable in six equal monthly installments for service rendered during the period from May to October. This makes the first payment a month later than heretofore.

California Highway Program Is Progressing, Report States

By the end of the present fiscal year California will have completed about 3,007 miles of its state highway program, according to a recent announcement of the California highway commission. The total mileage in the road system on which the state highway commission has charge of both construction and maintenance is about 6,300 miles.

There are in the state about 70,000 miles of dedicated public roads outside the boundaries of incorporated cities. Of this total more than 6,000 miles has been paved by state and county agencies. This mileage of paved surface is being rapidly increased by the extensive road construction and improvement projects now under way. The California state highway commission alone will this year expend about \$15,000,000 in new highway construction. During 1921 average costs for the different types of road were roughly as follows: graded roads, \$12,000 per mile, bituminized macadam, \$21,000 per mile, concrete base, \$30,000 per mile, and bituminous pavement, \$24,000 per mile.

New Transmission Line Dedicated by Washington Water Power Company

Appropriate ceremonies marked the official opening of the \$250,000 transmission line of the Washington Water Power Company into Grant county, May 11-12. People from all over the state gathered at Ephrata to join in the merrymaking and more than 2,000 were present when Governor Louis F. Hart pressed the button and power flowed through the wires.

In addition to supplying light and power to 14 towns, it is estimated that this will supply by electric pumps, water to irrigate 25,000 acres of land as fertile as any in the Yakima or Wenatchee valleys.

Since the company started work in February, a total of 165 miles of wire was strung, of which 108 miles was on new poles and 57 miles the restringing of the Wilbur line. Of the new construction, 58 miles is 60,000-volt high tension line and 50 miles 13,000-volt transmission lines.

The work was undertaken under most unfavorable weather conditions in which blizzards, snow drifts and mud all played their part in making it difficult. Nevertheless, it was put through in record time.

The construction of 100 miles of new power lines and the connecting up and rebuilding of present lines in the Palouse country has just been announced by President D. L. Huntington of the company. The cost of this improvement work has not yet been estimated in its entirety but the company engineers expect that from 100 to 250 men will be employed throughout the summer.

With the completion of this program, the Washington Water Power Company will have a link system in the Palouse country that will insure continuity of service. In case of a break only one town or community will be affected as service can be furnished over two lines out of Spokane.

New Power Company Is Formed at Auburn, California

To supply power for commercial purposes, water for irrigation in western Placer county and eastern Sacramento county, and to engage in the lumbering business, the American River Water and Power Co. has been organized with headquarters at Auburn, California.

James E. Walsh, president of the Placer County Bank, has been named president of the newly organized corporation. The directors are J. E. Walsh, Auburn; Jerome Barieau, Auburn; Fred P. Tuttle, Jr., Auburn; J. F. Dudley, Newcastle, and W. S. Graham, Ukiah.

According to J. E. Barieau, engineer for the project, the newly formed organization is the outgrowth of earlier plans to form the Central Sierra Power Company.

The Utah Power and Light Company is conducting a very aggressive campaign on the sale of its 7 per cent preferred stock. The results up to the present time have been highly satisfactory. Features of the campaign are newspaper advertising, window displays and poster advertising. The employees of the company are taking an active part in selling the stock.

Gas Facilities in Los Angeles Must Be Improved

Gas companies serving Los Angeles and vicinity are ordered to expend \$9,529,000 in order to augment the future winter gas supply, by a decision of the California Railroad Commission. The improvements ordered will increase the daily quantity of gas available for distribution 35,000,000 feet of artificial gas and provide against fluctuations of pressure during the periods of greatest use. Glendale is put on a straight natural gas basis.

The principal expenditure is to be made, according to the order, by the Los Angeles Gas and Electric Corporation and will aggregate \$8,729,000. The company planned expenditures of \$7,229,000 but the order requires in addition a gas holder for the western part of the city, having a capacity of not less than 7,000,000 cubic feet, and another in Pasadena, with not less than 5,000,000 capacity, the two to cost about \$1,500,000.

The Southern California Gas Company is required to provide a new holder in Los Angeles of 3,000,000 feet capacity, with compressors, truck lines and additions to gas plant, including generators, to cost approximately \$500,000.

Southern Counties Gas Company is ordered to install a 2,000,000-foot holder in the Santa Monica district together with compressors and truck line and a general enlargement of reinforcing mains in all districts, costing approximately \$300,000.

Freight Rates on Coal From Utah to California Reduced

Effective June 15, freight rates on domestic coal from Utah points to all main line points in California on the Western Pacific railroad will be reduced \$1.25 per ton and 85 cents per ton on bunker coal, if the application of the road to make effective a tariff now being published is not denied by the Interstate Commerce Commission. A similar announcement has been made by the Southern Pacific Company.

The Denver and Rio Grande Western and the Utah Railway Company, both serving many coal mines in Utah direct as well as the Los Angeles and Salt Lake Railroad will concur in the establishment of the reduced rates, was the opinion of local traffic officials.

To points not on the main line of the California roads and where the rate is more than \$7.25 per ton, the reduction on domestic coal will be \$1.25 per ton.

Last September, in reply to a request of the coal mine operators, the railroads operating between Utah and the Pacific coast reduced the rate on bunker coal from \$7.25 to \$6. The rates on all other classes of coal, however, remained unchanged at that time.

The action will afford Utah mine operators a better opportunity to ply their trade in a territory which they claimed has been rapidly dwindling because of the influx of foreign mined coal that can be shipped in much cheaper by boat than Utah coal can by rail.

Decision Relative to Utilities Given by Wyoming Judge

Public utilities have the right to impose reasonable rules and regulations requiring a deposit to cover a limited period of service, to refuse service when a customer declines to pay a just bill or make the required deposit, to refuse to furnish service unless the customer complies with the rules and regulations, and to terminate service when a customer refuses to pay his bill after proper notice, according to a decision handed down by District Judge Brown, of Casper, Wyoming, in the case of George F. Stilphen vs. the Natrona Power Company.

Stilphen sought a permanent injunction to prevent the company denying him steam service, to prevent him from being compelled to pay a back bill and also a deposit to cover two months' service.

In handing down the decision Judge Brown also dissolved a temporary injunction against the company and rendered judgment against Stilphen for bills for the months of April, May and June 1921.

Negotiations are now in progress in regard to the extension of the lines of the Dixie Power Company of Utah to supply electric power to Pioche, Caliente and the other communities in Lincoln County, Nevada. There is a large amount of mining business in this section, which is badly in need of electric power. It is approximately thirty-five miles from the power company's nearest line to this section.

New Officials Will Head General Electric Company Activities

Broadening of the engineering and research service of the General Electric Company and increasing its prestige here and abroad, is forecast by important changes in the directorate of the company, just announced.

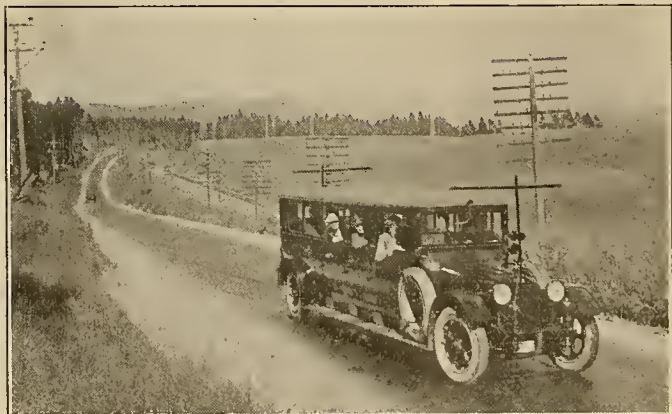
Following a meeting of the board of directors, held in New York, May 16, C. A. Coffin retired as chairman and was succeeded by Owen D. Young, long associated with the company as vice-president. The position of president was filled by the election of Gerard Swope, president of the International General Electric Co., succeeding E. W. Rice, Jr., who requested to be allowed to devote his entire energies to the further upbuilding of the scientific engineering and technical phases of the company's work in the broadest sense, and who will become honorary chairman of the board of directors. Anson W. Burchard, for many years identified with the company as vice-president, with particular reference to public utilities and foreign investment, was elected vice-chairman of the board. J. R. Lovejoy, vice-president in charge of sales, was elected a director, as was also G. F. Morrison, vice-president.

Particular significance is attached to the action of the board of directors in the creation of this position of honorary chairman, which will be filled by Mr. Rice for the purpose of extending G-E engineering service.

Mr. Coffin, the retiring chairman of the board, will continue as a director, to give attention to the problems of the company. He has been for 40 years a leading influence in the development of the corporation and was founder and creator of the company and its predecessor, the Thomson-Houston Company.

Mr. Rice, associate of Mr. Coffin and president of the company for the past eight years, wished to be relieved of the duties of detailed organization and management that he might devote his time to the general engineering problems.

A bill asking for the appropriation of \$150,000 for completing a dam to divert water from the Gila River in Arizona into the Gila Indian Reservation has been introduced into the U. S. Senate by Senator Ashurst of Arizona.



CALIFORNIA IS DEVELOPING TRANSPORTATION VIA STAGE

One of the newest all-steel auto stages developed for the California highways. The stage is equipped with radio receiving apparatus for the entertainment of passengers. Tests made recently at Sacramento, Oakland and San Francisco have been highly successful.

A view of the recently completed Union Stage Depot in Sacramento, California, from which six stage lines operate. The picture shows the rapid strides which have been made in this type of transportation during the past half-century.

Los Angeles Shipyard Gets First Contract in Year

Its first large contract for a ship-building project in more than a year was recently closed by the Los Angeles Shipbuilding and Drydock Corporation when it agreed to build the new ferry boats for the Key Route system of the San Francisco-Oakland Terminal Railway Company.

The addition of this new construction to the repair work which has been handled at the yards of the shipbuilding company will make possible the employment of hundreds of additional mechanics for several months to come. These ferry boats will be electrically equipped, much the same as the Golden Gate Ferry Company reported in a recent issue of *Journal of Electricity and Western Industry*.

At the yards of the Southwestern Shipbuilding Company, now controlled by the Bethlehem Steel interests, the work of installing floating drydocks and additional machinery is progressing rapidly. Much of the machine-tool equipment is being transferred to the Pacific Coast from yards on the Atlantic seaboard. Hundreds of thousands of dollars will be expended in providing complete facilities for repair and construction of ships and marine machinery. A large force of men will be given permanent employment at these yards in the course of a few months. The old Southwestern yard has not been operated since it finished the last Shipbuilding Board contract, many months ago.

Tacoma is in Legal Argument with Power Company

The city of Tacoma has refused to pay the bill of the Tacoma Railway and Power Company for current sold the city during March at the rates the company quoted in its notice of December 30, last. City Attorney Charles Dennis has advised the city to refuse payment of the bill for the service, with the exception of that part charged at the current rate, and to allow the company to bring suit if it wants to collect.

The March bill for current nearly tripled the bill as it would have been at the current rate, even at the price of steam-generated current which was charged. In addition to the approximately \$6,700 charged for the current, the company added a service charge of \$11,100, the latter charge being figured on the basis of a monthly charge of \$3 per kw. of maximum demand of the light department on the power company.

The city contends that its contract with the company for exchange of power to a maximum of 10,000 hp. is for overload service as well as break-

down service, so that the city has a right to call for power at any time it needs it, for any reason, up to 10,000 hp. The company claims that the contract covers break-down service only, and that it must add a charge to compensate it for keeping power available if it is to be called on for overload service too. Which interpretation is correct the courts will probably be asked to decide.

Tacoma and Seattle Arrange for Interconnected Power System

At a recent conference between city officials of Seattle and Tacoma, a formal agreement was made to connect the municipal power systems of the two cities for the purposes of interchange of surplus of electric current. It was decided to connect the two cities by a tie-line of 15,000-kw. capacity, costing \$150,000, half of which will be borne by each city.

With this interconnection, either city will be permitted to draw current from the other at a price of ½-cent a kw-hr. for water power electricity, and 1¼-c. for steam generated current. Mayor Hugh M. Caldwell of Seattle proposed that a clause be inserted in the contract that either city called on to furnish current under the agreement has the right to judge whether it has surplus power for sale, and this was approved by representatives of both cities. In addition to the cost of interconnection, Seattle will expend \$50,000 to connect the tie-line with the proposed sub-station at Spokane street. An ordinance providing for an appropriation of \$123,000 for this sub-station will be introduced in the Seattle city council immediately. Supt. J. D. Ross of the Seattle lighting department has pointed out that the Spokane street sub-station will be necessary, whether the Seattle-Tacoma interconnection is effected or not.

Denver Company Seeks Permit for Project on Colorado River

Plans for an extensive hydroelectric development in Gore Canyon near Kremmling, Colorado, by the Denver Gas and Electric Light Company, were revealed in an application filed with the Federal Power Commission recently by Clare N. Stannard, vice-president and general manager of the company.

The plan as outlined in the application, is to build a dam 230 ft. high across the Colorado River at Gore Canyon. The reservoir will have a capacity of 1,000,000 acre-ft. Water from the reservoir would be carried through a tunnel 4½ miles long to a power plant having a capacity of 65,000 hp.

San Francisco to Have First Home Beautiful Show in June

Plans have been perfected in San Francisco for the holding of a Home Beautiful Show in the Municipal Auditorium starting June 25, which will be the first exposition of its kind to be held on the Pacific Coast catering exclusively to women. Only such things as tend to make the home a more comfortable, convenient and beautiful place to live in will be shown. This will include furniture, carpets, draperies, electrical appliances, kitchen utensils, china and glassware, stoves, ranges, silverware, heating appliances and the like.

The booths will be in the form of rooms nine feet square. Special arrangements have been made by those in charge of the show to handle exhibits for manufacturers who have not the time nor the facilities to handle their own exhibits. The show is under the supervision of the Industrial Expositions Company with headquarters at 1026 Market St., San Francisco.

Idaho Utilities Consider System of Uniform Accounting

Invitations have been sent out by George E. Erb, president of the public utilities commission of Idaho, to E. V. Kuykendall of the department of public works at Washington, and Warren Stoutnor, a member of the Utah commission, asking them to be present in Boise June 5, at which time the Idaho commission will consider the advisability of adopting the uniform system of accounting proposed by the National Association of Railway and Utility Commissioners. Mr. Stoutnor is also chairman of the national association committee on uniform accounting.

Both of the men to whom Mr. Erb sent invitations are expecting to be in Boise for the annual convention of the Northwest Electric Light and Power Association which begins June 7, and they have been asked to come two days in advance of the convention.

The kelp-potash plant of the Bureau of Soils of the U. S. Department of Agriculture at Summerland, California, has been sold to Rodney Benson of Santa Barbara, who will immediately begin the manufacture of "Kelpchar," a decolorizing carbon of very high activity, and potash salts and iodine. The plant was constructed in 1917 and was operated for four years as an experimental and demonstrational station for the extraction of potash and its by-products from the giant kelp of the Pacific. It was closed through Congressional action in 1917.



SEATTLE'S BUILDING PROGRAM INCLUDES MANY NEW SCHOOLS

An architect's conception of the new James A. Garfield High School being built in Seattle at a cost of \$750,000. The building will be constructed of reinforced concrete faced with brick. It will house 1,500 students.



The Roosevelt High School to be built in Seattle in the near future will cost \$1,125,000. It is one of the most pretentious school buildings to be erected in a Pacific Coast city. It will be strictly modern.

California Commission to Inspect Electric Pole Lines in State

The California Railroad Commission has commenced an inspection of all electric pole lines in that state with a view to requiring elimination of all hazardous conditions and the more complete enforcement of state law requirements relative to safety of employees of the utilities and the public.

In conforming to its policy as enunciated at a hearing a few months ago, the commission has employed additional electric inspectors for this work. Utilities will be required to eliminate all hazardous conditions of line construction and comply fully with the requirements both under the state law and under the Commission's rules on safety.

The commission has during the past several years been comparing a new standard of construction to improve safety conditions. Owing to the conditions which existed during the war and for a year or two thereafter, detail inspection work was postponed. Under the present plan all electric railway, telephone and other utilities and municipalities operating pole lines will undergo a careful and thorough inspection and much work required to be done by the utilities which will benefit the public and increase the protection to employees working on these lines.

Oregon Organization Traces Path of Payroll Dollar

An interesting investigation was recently conducted by the Associated Industries of Oregon, to determine what becomes of the payroll dollar. In one case they found that out of 100 pay checks, 95 of them had been cashed in grocery stores near the homes of the workers. In another case 94 out of 100 pay checks were cashed in similar places. Still another factory issued 200 pay checks and 150 of them found their way into grocery stores. From this it is concluded that the pay roll dollar as a general rule begins to circulate through the groceryman, and accordingly the Associated Industries urges all retail stores to stock their shelves in so far as possible with home manufactured products, and thus help to build up local industries.

P. G. & E. Will Reconstruct Famous Carquinez Straits Span

In order to transmit the power from its Pit River development to the bay cities and central California the Pacific Gas and Electric Company is planning a complete reconstruction of its famous overhead cable across Carquinez Straits. This span, 4,427 feet in length, is one of the longest ever built and when first erected attracted the attention of the engineering world. The increased volume of hydroelectric power, which will be brought in with the completion of the first large unit of the Pit River development this year, will necessitate the raising of the line voltage from the present sixty thousand to one hundred and ten thousand volts, requiring a complete re-insulation of the towers on both sides of the crossing.

At the South Tower, on the Contra Costa county side of the strait, local distribution facilities are being increased to provide improved service to Richmond, Martinez, Antioch and vicin-

ity. Transformer capacity for this service is being increased from 3,300 to 27,000 hp. It is also planned to provide new and modern quarters for housing the company's operators at the South Tower and to improve the grounds with lawns and shrubs. The work will involve an expenditure of \$269,000.

Industrial Lighting Code Proposed for Washington Factories

Establishment of an industrial lighting code for manufacturing industries of the state of Washington is now in the process of formation through the efforts of a committee of electrical workers, electrical contractors and the safety division of the state department of labor and industries. When the code is perfected it will be submitted to the department of safety and a public hearing will be held to pass on the provisions, after which an order will be entered putting the code as adopted into effect. Where the inspectors can now only recommend the installation of proper lighting equipment, the order will make the regulations compulsory.

The plan is not to add expense by forcing employers to install new lighting fixtures, but rather to provide a standard for future installations. The code will not only embrace yard and factory lighting, but also the proper arrangement of skylights and windows. Day Morgan, electrical engineer, who has had experience in drafting lighting codes in other states, has been engaged to gather data and draft the code with the assistance of W. M. Meachem, electrical contractor of Seattle; F. G. Heller of the electrical workers and J. H. Lewis, electrical inspector for the department of labor and industries.

Pasadena Will Continue to Purchase Power for Another Year

The contract under which the city of Pasadena now purchases most of its electricity for resale to the consumers of the municipality will expire May 19th, and bids have been requested for energy to be supplied during the coming twelve months. Energy charges on the present contract with the Southern California Edison Company are 9 mills per kw-hr. for the first 200,000 kw-hr. per month, 8 mills for the next 300,000 kw-hr. used monthly and 7.5 mills for all in excess of 500,000 kw-hr. used in one month.

The city requires approximately 1,000,000 kw-hr. each month in addition to that generated by the reserve station operated by the city. Large extensions are now being made to Glenarm Station buildings, where the city will install additional apparatus in the near future, as well as providing permanent housing for equipment now temporarily provided for in the station yard.

The Park Utah mine, which is developing into one of the greatest ore producers in the Park City (Utah) district, is being equipped for electrical operation. The wiring is being installed on the panel system, and the most up-to-date methods are being used in the installation. When completed it will be one of the finest jobs of electrification in the state. Development work on this property is progressing rapidly, with large quantities of ore in sight.

Books and Bulletins

STEAM POWER PLANT AUXILIARIES AND ACCESSORIES

By TERRELL C. CROFT, consulting engineer and directing engineer of Terrell Croft Engineering Company. Member, American Institute of Electrical Engineers, American Society of Mechanical Engineers, Illuminating Engineering Society and American Society for Testing Materials. 6 by 8 in. First edition. 411 pages. 402 illustrations. \$3. McGraw-Hill Book Company, Inc., New York.

Most of the preventable losses in the engine room of steam power plants occur in connection with the auxiliary equipment. Generally speaking, there is little the operating engineer can do to increase the efficiency of the prime movers and neither do the latter give comparatively much trouble. Most of the trouble and maintenance expenses are caused by the auxiliaries, and the condition and operating efficiencies of these can be materially controlled by the operating men.

The book pays particular attention to pumps as these are used in every power plant. The subject is subdivided into pump calculations, direct acting steam pumps, crane action pumps, centrifugal and rotary pumps. There is a discussion of boiler feeding apparatus including boiler feed pumps and their governors, injectors and gravity boiler feeding devices. A closely allied problem is that of feed water heating and economizers which are thoroughly treated.

Following this are divisions on condensers and methods of re-cooling condenser water, divisions on steam piping, live and exhaust steam separators and the steam trap. Each chapter is followed by a set of problems so the book may be used as a text book for a home study course.

ECONOMICS OF INDUSTRIAL DISTRIBUTION

By P. O. REYNEAU and H. B. SEELYE, assistant electrical engineer the Detroit Edison Company and distribution engineering department the Detroit Edison Company, respectively. 6 by 8 in. 210 pages. 59 diagrams. \$2.50. The McGraw-Hill Book Company, Inc., New York.

In the designing, constructing and operating of electrical distribution systems the object to be striven for is to provide all customers with a good quality of service at the least possible cost over the system as a whole. This result can be attained only through the careful and conscientious application of the principles of economics to all parts of the system. In this book the authors have defined these principles and presented methods for their application.

Each part of a central station distribution system is taken up in turn and discussed as an individual portion of the company system. Problems pertaining to each unit are indicated, many of which are worked out in detail to illustrate the application of the method explained in the first part of the book. A particularly interesting section is that on single-phase secondary distribution, and as the majority of the total number of central station services are of this kind, the solutions presented in this chapter should be of wide application.

Meetings of Interest to Western Men

California Electric Railway Men Are Optimistic Over Future

Despite increased operation costs, burdensome franchise requirements and jitney bus competition, members of the California Electric Railway Association meeting in San Francisco recently, were optimistic over the future outlook of the electric railways of the state. It was stated at the meeting that there have been no receiverships during the past few years although several of the lines have undergone reorganization.

The following officers were elected to head the association during the coming year:

President, W. E. Dunn, vice-president Los Angeles Railway Corporation, Los Angeles; vice-president, William von Phul, president San Francisco Market Street Railway Company; treasurer, Anglo and Lon Paris National Bank, San Francisco; executive board, W. E. Dunn, W. R. Alberger, vice-president Key Route; William von Phul, Paul Shoup, president Pacific Electric Railway, Los Angeles; John A. Britton, vice-president Pacific Gas and Electric Company, San Francisco. W. V. Hill continues as manager.

Industrial Conference Will Be L. A. Convention Feature

Of outstanding importance in the program for the annual convention of the Pacific Coast Electrical Association, which is to be held in Los Angeles, May 31, June 1-2, will be the Industrial Conference in which many of the industrial leaders of the West and of the nation will participate. The conference will be held on the afternoon of June 2 and will be followed by the Association's annual banquet.

A number of notable men have consented to address the conference, which will be presided over by Wigginton E. Creed, president of the Pacific Gas and Electric Company. The list includes such men as Howard F. Beebe, of New York, president of the Investment Bankers' Association of America; Chester H. Rowell, member of the California State Railroad Commission; Charles F. Stern, vice-president of the First National Bank of Los Angeles; J. R. Teagarden, member of the California State Federation of Farm Bureaus; Robert Sibley, editor of the Journal of Electricity and Western Industry; Charles K. Field, editor of Sunset Magazine, and John D. Fredericks, president of the Los Angeles Chamber of Commerce.

John B. Miller, president of the Southern California Edison Company, will preside at the banquet which will follow the conference. One of the features of the banquet program will be a five-minute address by Secretary of Commerce Herbert C. Hoover. The address will be relayed by long distance telephone from Washington, D. C., to the Long Beach station of the Pacific Telephone and Telegraph Company, where it will be broadcasted by radio. Secretary Hoover is expected to deliver a powerful message on the development and achievements of the California power companies.

One of the entertainment features of the program will be the showing of the National Electric Light Association film, "Yours to Command," produced for the first time at the annual convention of that body at Atlantic City. Other entertainment features will be a special trip to the noted Mission Play at San Gabriel on May 31 for the lady guests and a trip for all delegates to Catalina Island on June 3.

The Wiltshire Golf Course is open to all delegates as is the course of the Ambassador Hotel.

Leaders in the electrical industry are of the opinion that the convention will be one of the most noteworthy in the history of the organization.

According to an opinion handed down recently by Attorney General L. L. Thompson, of Washington the municipal lighting department of the city of Seattle, or any other city which is engaged in the general business of manufacturing and supplying electricity to consumers, must obtain an electrical contractor's license, and furnish a bond to the state for \$500. The Seattle municipal light department remitted the fee, but protested against the bond requirement.

After July 1, Utah will be entitled to \$1,236,883 in federal funds for state roads, according to advices received by B. J. Finch, district engineer of the bureau of public roads, at Ogden. In the allotment of funds for the fiscal year beginning July 1, Idaho will not participate, according to report. The funds which will be expended in Utah are for projects that have been approved in the various counties of the state by the road commission and federal bureau.

Los Angeles Electric Club Will Take Part in Exposition

The Los Angeles Electric Club will be the largest exhibitor in the forthcoming Industrial Exposition and California's Pageant of Progress to be held in that city. Percy H. Booth as chairman of a committee composed of twelve prominent leaders in different branches of the industry, says this show will eclipse all previous efforts to fully inform the public and prospective buyers in everything electrical. Since the entire project is planned is avoid crowding on the part of the visitors, it is intended that all of the 25,000 sq. ft. of electrical exhibits shall be thrown open for demonstrations and close inspection by the public and a large corps of electrical experts will be in attendance at all times.

This activity of the electric club will be one of the major efforts made during 1922 to "balance up" the trade for dealers, jobbers and the other branches of the industry. The extreme activity in all branches of building and the craze for radio has had the effect of diminishing the sales and use of many important lines. A concerted effort is being made to help maintain a perfect balance in all directions of electrical expansion.

The Utah Light and Traction Company has begun its annual spring repair work on many of its tracks and the pavement coming under its control. Many important improvements are contemplated, including the re-laying of tracks in some sections, and entire new roadbed construction in others. The company plans to use reinforced concrete slabs instead of laying paving blocks along the sides of the rails in certain of its work. After the ties and steel have been laid, the outside of the rail will be paved with cement slabs four feet long and eighteen inches wide. The inside slabs will be one foot in width.

An electrical home, the first to be constructed in Spokane, Washington, is being built by the Spokane Electrical Service League, and will be open for inspection by the public some time in June. The home will cost \$15,000. It is being built by A. J. Chantry and Company and will embody every type of electrical convenience. R. B. McElroy of the Washington Power Company is chairman of the committee which is supervising the construction of the home.

The Portland Chamber of Commerce has endorsed the plan of Secretary of War Weeks to make Vancouver (Washington) Barracks the principal army camp for the northwest. It is pointed out that the buildings at Camp Lewis, Wash., are of a temporary character and would cost some \$600,000 a year to maintain, whereas all buildings at Vancouver are permanent, and in addition Vancouver is strategically located for the protection of the Northwest.

The town of Milton, Oregon, has applied for a permit to appropriate water from the Walla Walla river for the generation of electric power.

COMING EVENTS

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Annual Convention—Boise—June 7-10, 1922

PACIFIC COAST ELECTRICAL ASSOCIATION, AFFILIATED WITH N. E. L. A.

Annual Meeting—Los Angeles, May 31-June 2, 1922

AMERICAN ASSOCIATION OF ENGINEERS

Annual Convention—Salt Lake City—June 5-7, 1922

A. L. Ferver, director of public service and city engineer of Long Beach, California, has been chosen president of the newly organized Long Beach Electric Club. In enlisting the aid of many representatives of professions and businesses which are dependent upon the electrical industry but are not usually found associated with electrical men in club activity, the members of the industry in Long Beach have taken a forward



A. L. FERVER

step in the solution of many of the local problems of merchandising and construction. Consequently the possible scope of usefulness of the club in the community has been broadened. Mr. Ferver has had broad engineering experience in the West, having come to Denver from New York City a short time after his graduation from Pennsylvania State College in 1906. He was for 8 years in the office of city engineer in Seattle and later with a shipbuilding company in Seattle; then in Los Angeles, where he was plant superintendent of the Southwestern Shipbuilding Company. In July, 1921, he accepted his present position as city engineer of Long Beach.

W. P. Strandborg, publicity agent and advertising manager of the Portland Railway Light and Power Company, has been appointed a member of the advisory committee of the American Electric Railway Association, which will supervise matters relating to advertising, publicity and public relations insofar as they affect the electric railway industry. One of the important problems of the committee is developing a standardized plan of conducting campaigns for home financing of electric railway securities.

R. E. Fisher, vice-president of the Pacific Gas and Electric Company in charge of power sales, has recently attended the Convention of the National Electric Light Association at Atlantic City. Other Californians who were in attendance were John B. Miller and W. A. Brackenridge, president and vice-president respectively of the Southern California Edison Company.

John A. Britton, first vice-president and general manager of the Pacific Gas and Electric Company, and R. H. Ballard, vice-president and general manager of the Southern California Edison Company, delivered addresses by wireless from California to the Atlantic City Convention of the National Electric Light Association, held during the last fortnightly period.

Personals

R. M. Boykin, vice-president and general manager of the North Coast Power Company, with headquarters in Portland, recently returned from an extended business trip to the East.

Norman Olsen, formerly intermountain representative of the Gillespie-Eden Corporation, has resigned his position with that company and has entered the domestic refrigeration business in Kansas City.

Wigginton E. Creed, president of the Pacific Gas and Electric Company, gave a powerful address on the evils of the proposed Water and Power Act which is to be voted on by the people of California in November, before the Oakland Electric Club recently. Mr. Creed is one of the many far-sighted California industrial leaders who have the welfare of the state at heart and who are earnestly striving to see the bill defeated.

A. H. Rosenberg, manager of the New State Electric Supply and Fixture Company of Phoenix, Arizona, was a recent visitor to Los Angeles. He reports that business in that state is very satisfactory and far ahead of the corresponding period last year. He believes that the coming summer will break all records in his state for good business.

Herbert C. Hoover, Secretary of Commerce in President Harding's cabinet and internationally known western engineer, will deliver a five-minute address on the achievements of the California power companies at the banquet of the delegates to the annual convention of Pacific Coast Electrical Association at the Hotel Ambassador on June 2. The address will be given in Washington, relayed to Long Beach by telephone and



HERBERT C. HOOVER

broadcasted from the Long Beach station of the Pacific Telephone and Telegraph Company by radio. Every radio enthusiast on the Pacific Coast will be enabled to pick up the powerful message which Secretary Hoover will deliver. Thoroughly familiar with the industrial problems of the West, Secretary Hoover is expected to give a stirring address on the development of the electrical industry and its relation to industry in general.

Rufus G. Gentry, commercial manager of the Denver Gas and Electric Light Company, represented the Colorado Manufacturers' and Merchants' Association at the convention of the National Association of Manufacturers and the advisory committee of the National Industrial Council held in New York City May 8 to 13. Mr. Gentry is an example of what the members of the electrical industry in the West are doing



R. G. GENTRY

to forward industrial progress. At the convention which he attended such topics pertaining to industry as taxation, legislation, transportation and education were discussed. Mr. Gentry has been connected with the sales department of the central station for twenty-one years and under his direction the sale of electric appliances has increased 500 per cent. He has served as treasurer of the Manufacturers' and Merchants' Association for the past two years. He is also an active figure in Denver's civic life.

Franklin T. Griffith, president of the Portland Railway Light and Power Company, and Guy W. Talbot, president of the Pacific Power and Light Company, Portland, both attended the annual convention of the National Electric Light Association at Atlantic City. Mr. Griffith is chairman of the Water Power Development Committee of the association and Mr. Talbot is a member of the committee.

H. T. Plumb, electrical engineer attached to the Salt Lake City office of the General Electric Company, is a recent San Francisco visitor. Mr. Plumb, accompanied by Mrs. Plumb, came to the Coast to attend his daughter's graduation from the University of California.

William C. Sterne, chairman of the Rocky Mountain committee on Public Utility Information and D. D. Sturgeon, a prominent Denver electragist, served as captains in the recent drive for funds to complete the \$2,000,000 state hospital project.

Byron T. Patten, of the engineering firm of Ellery, Frost and Patten, with offices in San Francisco, Los Angeles and Fresno is engaged in investigating the conservation of water north of Fresno and on the west side of the San Joaquin valley. Mr. Patten is associated in this work with N. B. Ellery, formerly state engineer of California and I. Teilman, prominent irrigation engineer of Fresno.

E. R. Shepard, well known western engineer who for several years has been conducting a study of electrolysis for the Bureau of Standards in Washington, has retired from that institution in order to pursue the same line of endeavor under his own name. Mr. Shepard is a product of the West, having been born in Salt Lake City and having received his early education in Oregon. In 1904 he was graduated from the University of California and in 1906 received the degree of M.A. from Harvard



E. R. SHEPARD

University. Upon the completion of his academic training, Mr. Shepard was associated for two years with Stone and Webster and from 1909 to 1914 he was assistant professor of electrical engineering at Oregon Agricultural College. He resigned from this post to enter the Bureau of Standards. Mr. Shepard's publications, his numerous electrolysis surveys and field studies, and his activity in connection with the publications and research work of the American Committee on Electrolysis, of which he is a member, have given him a wide acquaintance and an enviable reputation in the field of electrolysis. His offices will be in Washington, D. C.

Harry Randall, district manager of the General Electric Company in Denver, is chairman of the committee in charge of displaying the Denver Electrical Home, which promises to break all records for attendance at an exhibition of this kind. He is being assisted by F. F. McCammon of the Denver Gas and Electric Light Company, N. R. Crooks of the Crooks-Nathan Household Appliance Company and J. C. Davidson of the Hendrie and Bolthoff Manufacturing and Supply Company.

Louis F. Leurey, consulting electrical industrial engineer of San Francisco, has recently completed a comprehensive investigation of the power possibilities in connection with the Don Pedro dam which is being erected by the Modesto and Turlock Irrigation District in California. Mr. Leurey recommended that the district accept the proposal recently submitted to them by John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company, whereby all power generated at the dam be purchased by the company.

Clark Rider, manager of the Denver Electrical Company, was one of the representatives of the Denver Commandery at the recent Knights Templar conclave in New Orleans.

Guy C. Wolf, director of research for the California Real Estate Association, told the members of the San Francisco Electrical Development League of the problems which are facing the electric railways when he recently addressed them on the subject of "Bankrupt Electric Railway Operation in California." Mr. Wolf has just completed a survey of this important situation.

John Dignan, who successfully directed the gas appliance campaign which was put on recently in California, has been retained by the California Electrical Cooperative Campaign to direct the June Bride Week campaign on electrical appliances which will be staged throughout the state during the week of June 5-10. The campaign is expected to be of untold benefit to the electrical industry of California.

Richard T. Eddy, for ten years attorney and examiner for the Interstate Commerce Commission, has resigned to become associated with the California State Railroad Commission as examiner. Mr. Eddy brings to his new position an extensive acquaintance with federal supervision of carriers and is also familiar with California conditions and rate problems. The new examiner went with the Interstate Commerce Commission in 1908 from Los Angeles and in 1912 was made attorney and special examiner. With the exception of a part of 1918 when he served as a captain in the U. S. Army Transport Service, he was continuously with the Interstate Commerce Commission until his recent resignation.

M. H. Goldhammer of the Denver office of the General Electric Company has recently been transferred to the New York offices of the company.

A. W. Childs, for several years superintendent of sales for the Southern California Edison Company, has been appointed to the position of manager of the commercial department. Mr. Childs is known throughout the West, both for his long service with the Edison company and his activities at large in the electrical industry. He has been a mem-



A. W. CHILDS

ber of the advisory committee of the California Electrical Cooperative Campaign since the inception of that activity and is at present chairman of the committee. He is also identified with much of the progressive work done by the Pacific Coast Electrical Association, the Home Economics Exhibit in Los Angeles and the Los Angeles Electric Club.

T. D. MacMullen, formerly secretary and sales manager of the Majestic Electric Development Company of San Francisco, has been appointed secretary and assistant manager of that firm. The company is one of the pioneers in the electric heating field and Mr. MacMullen has had a large part in directing the sales efforts which have popularized the reflector type of heater. He is one of the active members of the electrical industry in San Francisco, being actively associated with the Chamber of



T. D. MACMULLEN

Commerce, the Electrical Development League, the Pacific Coast Electrical Association and the California Electrical Cooperative Campaign. He served as chairman of the committee of electrical men who staged a comprehensive exhibit of electrical products in the recent Industrial Exposition. Mr. MacMullen's appointment has resulted in two other advancements in the company. H. H. Dayley, formerly heating engineer, has been appointed sales manager and H. H. Traxler, formerly city purchasing agent, has been made general purchasing agent.

Addison N. Smith, manager of the Broadway Store of the Southern Electrical Company, San Diego, in speaking before the Electric Club of that city recently said, among other things relative to closer cooperation between the electrical contractor-dealer and the home-builder that, "we builders of homes and electrical sales must quit spelling bungalow with a 'gle' and an 'oh'." He suggested that "convenience outlets" are a convenience only when high enough from the floor to be utilized without resorting to Delsarte gymnastics to reach one in the baseboard. His talk was adjudged a great success and well worth while.

Frank G. Baum, consulting electrical engineer; Harris J. Ryan, professor of electrical engineering at Stanford University; John A. Britton, first vice-president and general manager of the Pacific Gas and Electric Company and Robert Sibley, editor of the Journal of Electricity and Western Industry, have through the University of California Chapter been initiated into Eta Kappa Nu, the national electrical engineering fraternity.

Dr. W. R. Whitney, director of the research laboratory of the General Electric Company, spoke recently before a luncheon of the Denver Civic and Commercial Association on the subject of "Highbrow Research."

The Sprague Electric Works of the General Electric Company has issued Bulletin No. 48717, describing the Sprague system of electric motor drive and control for newspaper presses. The booklet is complete in every detail and is well illustrated.

The Indiana Steel and Wire Company, Muncie, Ind., has issued a new booklet, "Double Galvanized Steel Strand Iron and Wire for Electrical Transmission and Distribution." The booklet contains information of value to the electrical industry and will be sent from the factory upon request.

The Duplex Lighting Works of the General Electric Company has announced several additions to the duplex line of fixtures, including "Filterlite," a new development in the control of light for stores, offices, schools, libraries, lecture rooms, etc. New models in table and floor lamps have also been announced. These are finished in antique gilt and are highly ornamental.

The Casper Electric Supply Company has been organized at Casper, Wyo., to carry on at wholesale and retail a general electrical contracting and construction business and to handle electrical supplies and appliances of all kinds. The company is incorporated for \$50,000. The president is Otis L. Thompson and the other incorporators are J. M. Lowndes, H. L. Hubbel, George S. Scott and William O. Wilson.

Manufacturer, Dealer, and Jobber Activities

Pass and Seymour, Inc., Syracuse, N. Y., has issued a new booklet on sales information regarding "Elexits," new receptacles which have been designed to make every fixture portable. The company has also issued a booklet describing "Fluto" bases which have been designed to fit all outlets.

Harvey Hubbell, Inc., Bridgeport, Conn., manufacturers of pole line hardware, announces the appointment of Harry W. Bliven as vice-president of the company. For more than twenty years Mr. Bliven has been general sales manager for the company and as vice-president is to remain in charge of sales.

The Robbins and Myers Company, Springfield, Ohio, manufacturers of electric motors, generators and fans, announces that F. S. Hunting, for several years general manager of the Fort Wayne division of the General Electric Company, has resigned from that position to become president and general manager of the Robbins and Myers interests. C. F. McGilvray, former president, becomes chairman of the board of directors under the new plan.

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has issued leaflet No. 2061 covering its 1½-in. type "SS" centrifugal pumping unit. The unit has a multiplicity of uses including irrigation and industrial plant use, the furnishing of water to air conditioning machines and also the pumping of brine for ice making machinery and cooling water to electric transformers and electric furnaces. Compactness and ruggedness are two of its advantages.

The Joart Electric Company has been incorporated in Los Angeles for \$150,000 for the purpose of manufacturing and merchandising Joart electric washing machines. Henry Joseph, holder of the patents on the machine, is president of the company and Earl Hill is secretary. Offices are in the Citizens' National Bank Building.

The Lapp Insulator Company, Inc., Le Roy, N. Y., has issued Bulletin No. 88 describing a new feature in high voltage insulator production. The bulletin tells of the overpotential test to which the company's products are subjected.

Theo Dredge, Pacific Coast representative for the Coffin Valve Company, announces that the company has received the contract for the eight 36-in. special design hydraulically operated valves for installation in the Moccasin Creek plant on the city of San Francisco's Hetch Hetchy project. Coffin valves are now in successful operation at Big Creek No. 1, Caribou, and Kerckhoff plants in California.

The National X-Ray Reflector Company, Chicago, has recently acquired the famous Winslow Library, comprising 180 volumes of personally collected material which will be invaluable in aiding the design of lighting fixtures for any particular architectural treatment. The company has recently installed elaborate lighting exhibits in New York and Chicago illustrating the strides which have been made in the special design of fixtures.

The A. H. Petersen Manufacturing Company, Milwaukee, Wis., has perfected a complete set of attachments for its portable electric drill, "The Hole Shooter," which makes that tool an entire machine shop of usefulness. The attachments have been especially designed for use in garages and industrial plants. They include a radial portable drill press stand, brushes for cleaning and burnishing, rotary taper files, special emery grinding wheels in addition to many others.

The Thomas Day Company, San Francisco, lighting fixture manufacturers and dealers, has established branch headquarters in Sacramento under the management of J. Fred La Place. The company maintains branches in Los Angeles, Oakland, Portland and Salt Lake City.

Schweitzer and Conrad, Inc., Chicago, has issued Bulletin No. 108 illustrating type "R" pole top switch. The new design includes many improvements. It is made for voltages ranging from 15,000 to 70,000 volts.

The Morrison Electric Company, of Portland, has been purchased by Nelson C. Bowles, he having purchased the interest of S. C. Jaggard and become sole owner. Mr. Jaggard will hereafter take up more active work in the firm of Jaggard-Sroufe Company, which is going to branch out and expand its service.



THERE IS NO PICTURE TO ILLUSTRATE THIS STORY

Carl B. "Cap" Kenney, vice-president and California manager of NePage-McKenny Company, Arthur Dahl, general manager of C. W. Dahl and Son, San Francisco, and M. L. Hirsch of Alexander and Lavenson Electric Supply Company, are up early after a rough ride up the Sacramento River to attend a recent contractor-dealers' meeting. "Art" was wealthy the night before but that has no bearing on the real story behind this picture. "Cap" Kenney recently purchased a wireless outfit. He became enthusiastic. There was a concert scheduled one evening but "Cap" retired before it was broadcasted. He wanted to hear the concert so he wore the headset to bed. He went to sleep with the headset attached. He is now a firm believer in the possibilities of arranging for a radio alarm clock for the early morning.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

More steadiness is apparent in things industrial and commercial, and, though there are occasional spurts, fewer setbacks appear.

Furniture dealers are doing an active business with prices on a stable basis. In sections where lumbering, mining and construction work are active, business conditions are improving and jobbers report collections somewhat better, although in purely agricultural districts ready money is still scarce. Recovery of retail trade in the cities is still slow, with competition keen, and offerings of underpriced merchandise at sales affect regular trade.

More than a million dollars a day is paid in taxes of all kinds in the state, and the evidence of ample capital for new enterprise and industry is proof of the amazing resourcefulness of the state. Building permits during four months in San Francisco aggregate \$15,462,940, which include 1,040 new residences.

SEATTLE

Lumber mills affiliated with the West Coast Lumbermen's Association exceeded all recent production records in the week ending May 6, and for the first time in two years made a cut larger than the long-hoped-for "normal." Large and constantly increasing movement of Pacific Northwest lumber by rail to the markets of the central West and the upper Mississippi Valley is necessitating the operation of numerous mills in this section on two shifts a day.

During the month of April, the building department of the city issued permits calling for construction work estimated to cost \$1,632,175. There were fewer permits issued than during April 1921 but the values were higher by approximately \$200,000.

A slight improvement is noted in most wholesale lines, although retail trade has been retarded to some extent by a very late spring, and continued inclement weather. With the advent of fine weather this month, conditions have shown improvement and this improvement is expected to show rapid increase.

PORTLAND

With the condition of the lumber industry in the Northwest improving from week to week, the unprecedented building activity, favorable crop and fruit prospects, increasing bank clearings and the almost complete disappearance of the unemployment problem, the Northwest is slowly but surely approaching normal conditions. The rapid recovery of the lumber industry, which furnished approximately 60 per cent of

the payrolls of this section, has perhaps been the greatest contributory factor in the return to prosperity.

Building is very active throughout the Northwest and this year will undoubtedly show greater investment in building construction than any year in the history of this section. Construction for the most part so far this year has been confined to residences although some hotels and a number of apartments and garages have been erected. Industrial construction is stagnant.

Prospects are good for large grain and fruit crops although they will probably not equal those of last year. The season this year is from three to four weeks late, but under favorable weather conditions which have finally arrived it is expected that fruit will mature rapidly.

SALT LAKE CITY

With the advance of Spring, building activities are increasing, and the electrical merchants report business as showing a decided improvement. In fact retail merchants in practically all lines have noted a general improvement. The lumber and hardware dealers report lumber, hardware and building material on the jump. Collections are also getting better.

The Utah Copper company is operating seven steam shovels and shipping more than 200 cars of ore daily, with a gradual increase being noted in its operations as time goes on. Mining conditions, in general, throughout the intermountain section, are becoming more and more satisfactory, with many of the more prominent silver-lead camps producing their normal output.

The unemployment situation has improved to a considerable extent, and it is predicted that within the next thirty days this problem will be a thing of the past, at least temporarily. There is always, of course, a certain amount of seasonal unemployment.

SPOKANE

An exceptionally late cold spring has had a general depressing effect on business and in particular has slackened the sale of seasonable merchandise. Nevertheless, the feeling is one of optimism. April building records for home construction broke all records for that month in a decade and May has started the same way. There is a large county, state and federal government road building program in Idaho and Washington tributary to Spokane which is calling for large amounts of labor.

More encouraging still, the lumbermen are now receiving more orders than they can fill and several of the largest mills in the territory are starting two shifts. The situation has changed in the last two months so that now instead of unemployment being a

problem, there is already competition for skilled men in the lumber industry with a prospect that common labor will be scarce before the summer is over.

DENVER

That business continues to improve in this territory is strongly indicated by conditions reflected in this city. There are four outstanding factors of improvement, chief of which is the continued building boom. Permits for the first half of May were in excess of the similar period in the preceding month which established the second highest record in the history of Denver.

The second promising feature is the decrease of unemployment, especially in unskilled lines. According to the United States Employment Service, Denver ranks close to the top in improving conditions requiring the services of both men and women. Certain building crafts cannot supply the journeymen required.

Fewer store buildings are for rent than at any time in the past year and rentals are not decreasing, which is representative of the third factor.

Fourth and of unusual importance is the financial situation. The May 5th statement of the Denver National banks showed deposits of \$148,593,000, an increase of nearly \$3,000,000 over the March statement and the highest figure reached since December, 1920. Consequently more money is available for loans, many of which are being made on a 6½% basis.

LOS ANGELES

Cities, counties and all utilities are finding it necessary to make large expenditures due to the continued growth of population in all directions. Roads, streets, and sanitary systems are the greatest problem of the budget committees of the counties and cities. In this field there is an unprecedented activity and millions are required to meet the bare necessities without providing any surplus capacity.

Transportation facilities at harbors and freight terminals are being increased and the work will be carried ahead for many months before adequate arrangements are made to provide service.

Building activities in the city and country districts continue without any let-up. Many contracts for excavations and buildings are being carried on at night by the aid of electric lighting. Finishing of interiors in business structures is rushed to completion with double shifts by the same means.

Building materials are available in sufficient quantities to meet all demands. Construction-tool firms are reaping the benefits of the increased facilities which they provided during last winter.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

Buildings

Ariz., Phoenix—Leshner, Kibbel & Mahoney, architects, will soon have plans completed for a \$250,000 high school building at Jerome.

Cal., Los Angeles—The Southern California Telephone Company is rushing its contracts for new buildings in order to comply with the conditions of the State Commission's decisions. A new addition to the exchange at Gower Street will be 3-story with provisions for two stories to be added later. Llewellyn Iron Works received the contract for steel work and the general contract was awarded Macdonald and Kahn. A new warehouse is also being constructed by the same contractor at San Pedro St. and Du-casse Alley.

Cal., Palo Alto—The Turner Co. of San Francisco has been awarded the contract for mechanical equipment, heating and lighting, at a cost of \$292,400 for the veteran's hospital to be erected here. Contract for construction of the hospital was earlier awarded to Mahony Bros. of San Francisco.

Cal., Los Angeles—A \$600,000 high school will be erected at Fairfax and Melrose Sts.

Cal., Santa Ana—The Santa Ana Commercial Co. will erect a \$75,000 ice plant and storage warehouse on East 1st Street. J. S. Fluor, contractor.

Cal., Orange—The California Wire Co. will erect a steel and brick factory building south of the present building on Cypress and Maple Sts., to cost \$65,000.

Cal., Los Angeles—California Electric Co. of Los Angeles plans erection of factory building in this city to cost \$200,000 for the manufacture of combination heating and cooling fan for use in summer or winter. A. H. Vance, vice-president of the company.

Cal., Los Angeles—Arthur G. Lindley is completing revised plans and taking sub bids for two and part three story frame plaster church building, on Pasadena Ave. between 65th and 66th Streets, for Methodist Episcopal Church—cost \$45,000.

Cal., Santa Monica—Ground will be broken with the next few weeks for the \$90,000 Masonic Temple to be erected at 10th and Santa Monica Blvd. The building will be two stories high of brick construction.

Cal., Hollywood—The Southern California Telephone Co. is contemplating the construction of a branch exchange building in Hollywood, to cost approximately \$90,000.

Cal., Santa Ana—Work has started on the new factory plant for the Orange County By-products Co. on the grounds of the California Crate Co., where they will manufacture fuel brick from sawdust and shavings.

Cal., Calexico—Contracts for the erection of a cotton gin at Mexicali to cost \$125,000 have been let by H. H. Clark, general manager of the Colorado River Land Company, to the Lummis Cotton Gin Company, Dallas, Texas. Agreement has also been made with the Southern Pacific to construct a spur track from the main line of the Inter-California Railroad to the site of the new gin.

Cal., Ventura—The Ord Ice Company of Santa Barbara has begun the erection of an ice plant and storage house at Santa Clara and Figueroa Streets, to cost \$40,000. The machinery will be driven by electric power.

Cal., Atascadero—Caladero Products Company has awarded the contract for its new cold storage plant to the Gay Engineering Company

of Los Angeles at a price said to be \$200,000 complete for buildings and equipment.

Cal., Ontario—Ontario Feed and Fuel Company will enlarge its facilities by building a reinforced concrete warehouse and storage structure at Plum and Main Sts. Campbell Construction Company will have the contract at a cost of \$34,650 complete.

Cal., San Diego—The Board of Education has completed its plans for the additions to the Balboa Park Junior High school by letting a contract to O. I. Eckles for a concrete and tile structure at a price of \$300,000.

Cal., Ontario—The Security State Bank will have new quarters at Euclid and B Sts. according to a contract awarded to the Campbell Construction Company for the sum of \$50,000.

Cal., Los Angeles—Two large sites for the location of branch banks were recently purchased by the Security Trust and Savings Bank, one at the southwest corner of Pico and Alvarado Streets and the other at the northeast corner of Vermont and Santa Barbara Avenues. Present buildings on the sites will be removed and at the Pico Street site a substantial business block will be erected and at the other site a modern bank building will be built.

Cal., Los Angeles—The Hollywood Hospital Association, through Dr. Edwin O. Palmer, president, has announced that the action of the city council in sustaining the protests of property owners and refusing to permit the association to build its proposed hospital into a part of its property now zoned against hospitals will result only in a revision of the architects' plans. The hospital will be six stories instead of three, as originally planned and will cost approximately \$300,000. The additional area of land owned by the association will be used for buildings to be occupied as residences by nurses and physicians and other attaches of the hospital.

Cal., El Centro—The Imperial County Irrigation District directors have fixed June 1st as the date for an election of the proposed bond issue of \$7,500,000 to consolidate the various water companies and provide needed drainage.

Cal., San Bernardino—Construction of the state home for feeble-minded, known as the Pacific Colony, near Pomona, will be commenced at once at a cost of \$120,000 for the initial expenditure, also \$400,000 will be expended at the Norwalk Hospital for the insane in new buildings, as announced by Dr. John A. Reilly, new director of state institutions. Improvements at Norwalk will include receiving and treatment hospital and five cottages with a capacity of 400 patients.

Cal., San Francisco—Meyer & Johnson, architects, report that work will begin on a nine-story theater-hotel-store building on the southeast corner of Eighth and Market Streets, owned by A. F. Rousseau and associates, early next year. Estimated cost of structure is around \$1,250,000.

Cal., San Diego—Wright and Doran, of San Diego, have been awarded a contract for the erection of a gun shed at the marine brigade post on Barnett Ave., to cost \$77,000.

Cal., Los Angeles—Plans have been completed for the two-story addition to the present plant at Venice of the Santa Monica Dairy Co. Clifford Truesdell, Jr., architect.

Cal., Los Angeles—Aimee Semple McPherson will erect a \$200,000 tabernacle at 1100 Glendale Blvd., which will contain an amphitheater.

Cal., Riverside—W. P. Day and others will erect a flour mill in White's addition.

Cal., Los Angeles—A 14-story office building to cost approximately \$2,000,000 will be erected on the site of the present City Hall building, according to Councilman Sparks.

Cal., Los Angeles—Plans for a county Hall of Justice to be erected at Temple and Broadway have been completed and approved by the Board of Supervisors. The cost is estimated at \$3,000,000. Working drawings are being prepared in the county drafting rooms under the officers of the Allied Architects Assn.

Cal., Los Angeles—A \$17,500,000 bond election will be held on June 6 to provide funds for new schoolhouses and equipment.

Cal., San Francisco—Chancellor & Lyon Co., owners, will erect a four-story and basement brick business building on Polk Street, between Ellis and Willow Ave., to cost \$100,000. The York Realty Co., contractors; W. L. Schmolle is the architect.

Cal., San Francisco—The Emanuel Sisterhood will erect a three-story and basement brick and concrete club at Steiner St. and Golden Gate Ave., estimated cost, \$130,000. Contractors, Barrett & Hilp; architects, Julia Morgan and Dorothy Wormser.

Cal., Knights Landing—It is expected that work will begin in about 60 days on the construction of a \$50,000 grammar school building, for which bonds were recently voted. J. F. Anderson, G. H. Fish and W. H. Hopper are trustees of the district.

Cal., North Sacramento—Contract has been awarded to Herndon & Finnegan for the construction of additions to both the North Sacramento and Hagginwood schools, at \$56,000. New heating systems for each school are included in the bid.

Cal., San Francisco—C. A. Meussdorffer, architect, has announced that plans are completed for a nine story and basement, Class A residential apartment building to be erected at a cost of more than \$180,000 on the northeast corner of California and Gough Streets. MacDonald and Kahn are the contractors. Construction will be started immediately.

Cal., San Francisco—Plans have been completed for a five-story apartment building to be erected on Pacific Avenue, west of Franklin, by Harry M. Seigler. The cost is estimated at \$100,000.

Cal., San Francisco—A two-story Class C factory building will be erected on Folsom Street west of Fifth by Louis Lurie for the Great Western Supply Co. Estimated cost is \$30,000. O'Brien Bros. are the architects.

Cal., San Francisco—James Dewaras, owner, is planning the construction of a five-story and basement reinforced concrete apartment and store building on Eighth Avenue and Fulton Street. Estimated cost, \$116,000. Henry Shermund, architect.

Cal., Oakland—The Cleveland Metal Products Co. will build a new plant on the northeast corner of 45th and Hollis Sts. The building will be of reinforced concrete.

Cal., Sacramento—C. E. Hoffman, owner, has awarded a contract to E. D. Brier for the construction of a two-story, twelve-flat building to be erected on Fourteenth Street near Capitol Park, estimated cost \$30,000.

Cal., Fresno—The Fowler Presbyterian church has had plans prepared by E. W. Peterson, of Fresno, for a new building to cost \$65,000.

Cal., Hollywood—California Electric Co., of Los Angeles will erect a \$200,000 factory building at Hollywood.

Cal., Lodi—J. Chirhart of Stockton has been awarded the contract for the Dominican School to be erected on Pleasant Ave. and West Walnut Street. Plans were drawn by J. J. Donovan of Oakland. The building will be constructed of tile and concrete and will cost \$65,000.

Cal., Oakland—Announcement has been made of the proposed construction of a \$50,000 addition to the plant of the Magnavox Co. in East Oakland. The new addition will adjoin the present plant opposite Twenty-seventh Ave on the south side of East Fourteenth St. and will be two stories high of concrete and brick construction. J. E. Cahill is the architect.

Cal., Hanford—Announcement has been made by the Hanford Ice Co. that a new factory will be built immediately to be operated in addition to its present plant.

Cal., San Francisco—The Republic Engineering Co., owner of the property at Forty-ninth and Cabrillo Sts., is planning the erection of a four-story reinforced concrete hotel building of Spanish design, to contain 100 rooms and all modern appointments. William Beasley is the architect.

Colo., Colorado Springs—An election will be held early in June for an issue of \$900,000 in bonds to be used for a school improvement plan, which includes three junior high schools and a high school gymnasium.

Ore., Portland—Portland may have a glass factory if plans of local business men materialize who are trying to finance an industry of this kind in this city. It is stated that there are about 2,000 carloads of glass containers used in Oregon, Washington and Idaho each year and because of the fact that there is no glass factory nearer than San Francisco, a glass factory in this city would serve a large territory and would have little competition. It is planned to ship sand from Belgium in ballast cargoes at low cost, while Northwest sand and quartz would also be available.

Ore., Salem—Improvements aggregating between \$50,000 and \$60,000 will be made in the plant of the Oregon Pulp and Paper Co., in the next few months, according to announcement recently made by C. F. Beyerl, general manager.

Ore., Salem—The Starr Fruit Co., now operating in Portland, The Dalles and Freewater, will erect a modern cannery and preserving plant in Salem at an early date to cost approximately \$75,000.

Wash., Tacoma—The Roman Meal Company has acquired a factory site in the Center Street district, and plans are being prepared in the company's eastern office for a factory in Tacoma. The company was organized in 1913 by Dr. Robert Jackson of Tacoma, and with limited capital, he has built up the Pacific Coast business to over 50,000 cases annually, according to a statement from the company. The company's headquarters are now in Buffalo, N. Y., with Dr. Jackson as president and George F. Booth, vice-president and general manager.

Cal., San Francisco—Permit has been granted the Salvation Army for the construction of an eight-story and basement reinforced concrete hotel to be erected on McAllister Street, west of Jones, estimated cost, \$220,000. Norman R. Coulter is the architect; Vukicovich & Bagge are the contractors.

Cal., Riverside—School bonds in the amount of \$500,000 were authorized at a recent election here. The apportionment is \$225,000 for elementary schools, \$175,000 for high schools and \$100,000 for junior college.

Cal., Oakland—The Pennzoll Co., affiliated with Penn's American Refining Co., has purchased two acres on Powell Street, west of San Pablo Ave., where a modern plant will be erected. N. Day is sales manager for the company.

Bridges

Cal., Sacramento—Parlier & Lowrey, a Tulare firm, were the lowest bidders on the construction of a bridge across the Cuyama River in Santa Barbara County, their bid being \$50,818.

Cal., Los Angeles—Plans for the Rubidoux bridge, a concrete structure to be erected over Santa Ana River, have been adopted by the Board of Supervisors. Sketches were drawn by Hongton & Bonte, of San Francisco.

Dams

Ariz., Prescott—Bids will be ready within the next 30 days for construction of Banning creek dam, an adjunct to the Prescott water system, as announced by A. Kline, city engineer. The dam will be 62 ft. high, 292 ft. long, with wing wall sustaining the spillway 225 ft. long. The cost is estimated at \$150,000.

Ariz., Prescott—Banning Creek is the location of the proposed dam for adding to the city water supply. According to plans now prepared by City Engineer Art Kline the dam will be constructed of concrete and will impound not less than 100,000,000 gal. when full.

Ariz., Phoenix—Lynn S. Atkinson, Jr., of Los Angeles has commenced actual construction on the Cave Creek flood control dam. With the revision of the plans made by J. S. Eastwood of San Francisco it was possible to construct this dam of concrete on the multiple arch principle cheaper than an earth fill dam as contemplated at first. The contract price is \$372,294.

Cal., Los Angeles—Construction is about to start on the Pacoima canyon dam which will serve the joint purpose of flood control and water storage for irrigation purposes. Plans were prepared by Lars Jorgensen of San Francisco. Cost is estimated at \$1,500,000.

Mont., Helena—The Crow Creek irrigation district is planning the construction of a storage reservoir on the Big Hole river. Engineer Wiley is in charge of the survey.

Highways

Cal., Sacramento—The State Highway Commission has awarded the contract for the grading of a nine-mile unit on the Tahoe-Ukiah road, extending from the westerly boundary of Lake County and Upper Lake at a price of \$167,359.50. Redmond, Page and Co. of San Francisco are the contractors.

Cal., San Francisco—A contract for widening and thickening the state highway between San Juan and the Pajaro River has been awarded by the California highway commission, at a contract price of \$47,802.

Cal., Sacramento—The California Construction Co. of San Francisco submitted the lowest bid for surfacing nine miles of highway between Fairfield and Vacaville in Solano County, the price being \$47,570.

Nev., Reno—Contract has been awarded to J. H. Causten, of Lovelock, for the construction of the state highway from Leeteville to Hazen at \$49,500. John Ross, of Reno, was awarded the contract for construction of the road from Yerington to Wilson for \$53,889. Kroft & Bundy, of Ogden, Utah, have been awarded the contract for building the road from Bulkhead to connect with the Hudson-Aurora highway, for \$22,927.

Irrigation Projects

Ariz., Phoenix—Quinton, Code & Hill, of Los Angeles, have been commissioned by the Inspiration and Miami Copper companies to prepare plans for the complete development of the Mormon Flats project. \$6,000,000 is estimated as the cost for this 47,000-hp. development.

Ariz., Florence—Ashurst dam of the Gila River project which is being constructed by the bureau of Indian Affairs of the Department of

the Interior, will be dedicated in the near future. The construction work in connection with the irrigation of 62,000 acres is progressing rapidly, although much work still remains to be done.

Cal., Riverside—Plans are under way for extensive development of the Pomba Ranch south of Temecula, which will include construction of a dam to provide irrigating facilities and other improvements to cost approximately \$500,000.

Cal., Corona—\$500,000 will be expended by the Temescal Water Company if the state water board grants the application to this company for 20,000 acre-ft. from the Santa Ana River to be diverted from the flood waters during the months between October and April.

Cal., Placerville—Contract for the construction of the El Dorado Water Corporation's Webber Creek project has been awarded to Edward W. Hesse, Mills Building, San Francisco. The project consists of an irrigation system and dam.

Mont., Great Falls—Bids will be received up to June 2, 2 p. m., on the structural and lateral work for the irrigation of the second Greenfield bench unit of the Sun River irrigation project, involving the expenditure of about \$200,000.

Power Plant Equipment

Ariz., Tucson—The Federal Light and Traction Company is planning to spend \$150,000 in improvements and new equipment in gas and light departments of the Tucson Gas, Electric Light and Power Company, according to E. N. Sanderson, president.

Cal., Beaumont—The Southern California Edison Company will soon commence erection of substation at First and Ohio Streets on the South mesa of the Yucaipa Valley. The substation will consist of three buildings; capacity of station is to be 4,500 kw.

Cal., Venice—The Southern California Edison Company will erect a modern sub-station in this city to provide capacity for the anticipated loads of the coming winter. They have petitioned the city for an industrial site at Virginia and Venezia Sts.

Ida., Boise—The power plant of the Boston Idaho Gold Mining Company, at Grimes Pass on the Payette river was completely destroyed by fire of undetermined origin, according to report. The damage is estimated at between \$75,000 and \$100,000. The plant was covered by insurance and it is expected that it will be rebuilt.

Ore., Hood River—Construction of a 6,000-kw. hydroelectric plant on the Hood River a short distance from here, which will cost approximately \$1,250,000 will be undertaken immediately, according to announcement by the Pacific Power and Light Company, with headquarters in Portland. The war interfered with the original intentions of the Pacific Power and Light Company to build a plant on the same site in 1913, although the plant proposed at that time was smaller than is now contemplated.

Power Projects

Ariz., Phoenix—The Salt River Valley Users Assn. plans to expend approximately \$6,000,000 for development of electrical energy. The work will be on the Salt River at Mormon Flats between Roosevelt Dam and Granite Reef.

Cal., Banning—The Southern Sierras Power Co. will start extensive development in Snow Creek, about 15 miles southeast of Banning. Two power houses are planned, one plant to be erected at once.

Cal., Los Angeles—The Little Rock Creek Power and Water Co., owned by Los Angeles interests, plans the construction of two large reservoirs in Little Creek for the purpose of generating power which will be sold to Southern Sierras Power Co.

Cal., Sacramento—Arrangements to send engineering parties into the field this month to obtain data regarding the feasibility of the Silver Creek project in El Dorado County as a municipal hydroelectric system are being made by City Engineer Albert Givan. H. L. McCready, of the State Engineering Dept., will be placed in active charge of the engineering work. The project contemplates the development of 100,000 hp. by these storage reservoirs and power houses, located about 60 miles from Sacramento.

Cal., Sacramento—Applications to appropriate five second feet of the waters of the south fork of the American river to generate electricity for Camp Sacramento have been filed by City Engineer Albert Givan with the United States forest service and the state water commission. The power plant, it is expected will be installed next year, and a recommendation for the money necessary for the improvement will be made in the budget to be presented to the City Council this fall.

Cal., Los Angeles—Engineers of the Santa Fe Railway are preparing plans for power house to be erected at San Bernardino. The building will be of reinforced concrete and will cost approximately \$100,000.

Cal., Riverside—Southern Sierras Power Company will immediately develop 1,000 hp. on Snow Creek according to permit recently granted by Federal Power Commission. Operating head will be 825 feet and an ingenious system of reservoirs and flow lines will make several thousand horsepower available during peak hours.

Nev., Rhyolite—The American Carrara Marble Company will install the plant for generating electricity at Carrara, which will be carried over a 15-mile line to the Johnny Cyte mine which has been taken over by the Natural Resources Development company for the consideration of \$80,000. The Natural Resources Development company president, W. Dye of Carrara is operating the Bankers lease on the Florence Goldfield mine and the John Cyte mining property on the west slope of the Funeral range overlooking Death valley. The type of the mill will be decided later. W. Calvert, consulting geologist of Salt Lake City, is acting as consulting engineer.

Wash., Tacoma—An ordinance No. 7680 has been passed by the city council providing for the extensions and betterments to the present electric generating plant of the city of Tacoma; providing for the erection of buildings and the purchase of machinery and equipment; and appropriating the sum of \$300,000 from the light fund in payment of the cost thereof.

Railways

Cal., Los Angeles—D. W. Pontius, general manager of the Pacific Electric Railway, announces that plans are under way for the construction of a tunnel from Hill Street station on the Pacific Electric Railway to First and Glandale Avenue. An elevated track from the P. E. station, 6th and Main Streets to the Southern Pacific and Union Pacific Depots is also contemplated.

Cal., Long Beach—The Union Pacific Ry. will erect a freight depot 50 by 200 ft., of brick construction and cement floors, platforms and runways. Lynch Construction Company of Salt Lake City was awarded the principal contract at \$25,000.

Ore., Baker City—Ten miles of logging railroad costing about \$75,000 will be built to a large tract of timber in this vicinity, according to announcement by Frank Gardiner, general manager of the Baker White Pine Company. The road will ultimately be 25 miles in length, work on the first unit of 10 miles will start at once.

Ore., Portland—A large lumber concern of Logtown, Miss., will soon begin the logging of

6,000 acres of timber land containing 400,000,000 ft. of fir, on the Clackamas river about 40 miles southeast of the city of Portland. A five-mile electrified logging spur will be built for the lumber concern under contract by the Portland Light and Power Company, to connect the railway's present electric line with the timber tract. This work will be completed this summer and logs will soon thereafter be placed on the Portland market.

Street Lighting Systems

Cal., San Diego—W. A. McNally and Company of Pasadena was awarded the naval base contract for lighting system at a price of \$34,400. Work on the distributing lines and street lights will be commenced at once.

Cal., Fullerton—The city officials have requested bids on an extensive ornamental lighting system. The specifications call for Novolux units and the number contemplated in this contract will be 156. Posts are to be of concrete or marbellite finish.

Cal., Los Angeles—The city is contemplating the construction of several ornamental lighting systems and the county has asked for bids on a system to embrace the Montrose district. All city work is to be Marbellite posts with the exception of the extension to the Broadway intensive arc lighting system; these posts will be iron to match the present installation.

Ore., Scappoose—Scappoose, a small town 20 miles down the Columbia River from Portland, may have electric lights soon, according to report. It is stated that the Portland Railway, Light and Power Company is planning to extend the 11,000-volt line now under construction to Rocky Point about 4 miles from Scappoose, on into the town and a short distance beyond to supply the people of that community with light and power service. The line will cost about \$10,000.

Wash., Seattle—An ordinance has been passed by the city council for the improvement of University Way by the installation of a cluster lighting system. Bonds bearing interest at the rate of 6 per cent will be issued to cover the cost of the project.

Wash., Olympia—City Council has been petitioned to install a boulevard lighting system in the business section of the city, the petition being signed by more than 70 per cent of the residents affected. The improvement, it is estimated, will cost \$14,000, at a rate of \$1.60 a front foot.

Streets and Sewers

Utah, Ogden—Bids for the paving of fifteen blocks in Ogden, the largest number of blocks ever embraced in one district, were opened by the city commission recently. The Taylor-Child Construction Company of Ogden was the lowest bidder, with \$156,358 for reinforced concrete. The Moran Paving Company bid \$170,942 for bitulithic, and Strange & Vallandingham bid \$166,478 for concrete. The bids were referred to City Engineer W. E. Craven for tabulation and report.

Waterworks

Cal., San Diego—Plans are being considered by the city trustees to call a bond election in June for the purpose of voting on an issue of \$200,000 for the installation of a new water system in East San Diego.

Ida., Caldwell—Hartenbower Bros., local contractors, have been awarded the contract for the \$30,000 water works in the village of Vale, where a reservoir storage system will be used and a complete new distribution system put in through the town.

Miscellaneous

Cal., San Francisco—Ferry Boats—The Los Angeles Shipbuilding Co. submitted the lowest bid for construction of two steel ferryboats for the San Francisco-Oakland Terminal Railways Co. Their bid was \$586,000. W. R. Alberger is vice-president and general manager of the railway company.

Cal., Sacramento—New Corporation—The Electric Manufacturing Corporation of Los Angeles has filed articles of incorporation, with a capital stock of \$220,000. It will manufacture electric equipment. The American Protection Corporation of San Francisco was incorporated for the purpose of installing and operating protection electric signals in the bay city, with a capital stock of \$220,000.

Cal., San Francisco—New Corporation—The Westgate Metal Products Co., capitalized at \$2,500,000, was recently organized to engage in the manufacture of castings, tool fixtures, electric utensils and other metal products.

Cal., San Diego—Gas Holder—Construction of a 6,000,000 cu. ft. capacity gas holder, to cost about \$100,000, has been announced by the San Diego Consolidated Gas and Electric Company. Work will be started at once. H. H. Jones is general manager of the company.

Cal., Los Angeles—Sewage Disposal—City Engineer Griffin has recommended to the Board of Public Works that the sum of \$153,000 be appropriated by the city council for the construction of sewage filtration treatment tanks with a capacity of 3,000,000 gal. every 24 hours.

Cal., Moorpark—Land Development—H. J. Crinklaw is planning to subdivide about 400 acres into small farms and home tracts.

Cal., San Diego—Gas Holder—Construction of a 6,000,000 cu. ft. capacity gas holder, to cost about \$100,000, has been announced by the San Diego Consolidated Gas and Electric Company. Work will be started at once. H. H. Jones is general manager of the company.

Cal., Los Angeles—Sewage Disposal—City Engineer Griffin has recommended to the Board of Public Works that the sum of \$153,000 be appropriated by the city council for the construction of sewage filtration treatment tanks with a capacity of 3,000,000 gal. every 24 hours.

Cal., San Pedro—Coal Plant—A modern coal-handling plant for handling bunker coal is being installed by the Standard Coal Company of Utah. The barge and its equipment will represent the latest improvements in automatic coal-loading machinery. It is to be located near the old submarine base and the new immigration station.

Cal., Bakersfield—Pre-cooling Plant—Construction of a pre-cooling plant for shipping of grapes to cost \$1,500,000, building of a railroad at least seven miles long from the Southern Pacific line at Edison station southward was disclosed by the Di Giorgio Farms company, of which Joseph Di Giorgio is president. The pre-cooling plant to measure 528 ft. sq. will be used to chill grapes.

Nev., Eureka—Flotation Plant—The Holly Consolidated Mining Co., a consolidation of the Eureka-Holly and Bushwacker properties, announces that construction of a large flotation plant will be undertaken at an early date.

Ore., Astoria—Dredging—Construction work on the initial units of the Tongue Point Naval Base will begin about June 1, according to Lieutenant-Commander Church who is in charge of the preliminary work. The first work to be done under government appropriation which is now available is the dredging of a turning basin and the depositing of the dredged material to fill in a number of finger piers and ground for operating buildings.

Wash., Carlisle—Lumber Plant—Work of electrifying the lumber plant of the Carlisle-Pennell Lumber Company at Carlisle, and installing a monorail system for the handling of lumber, recently started, will cost \$250,000.

Journal of Electricity and Western Industry

25 Cents a Copy

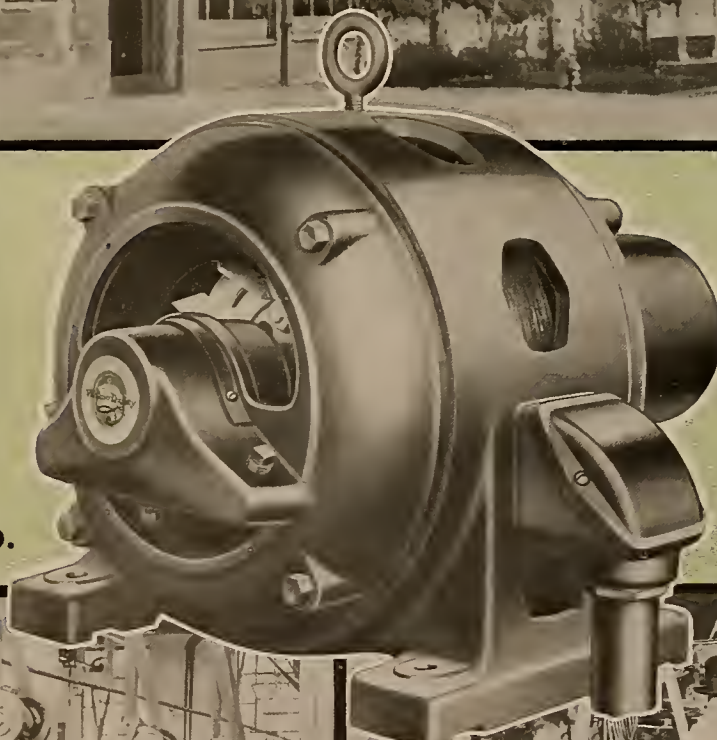
June 15, 1922

San Francisco



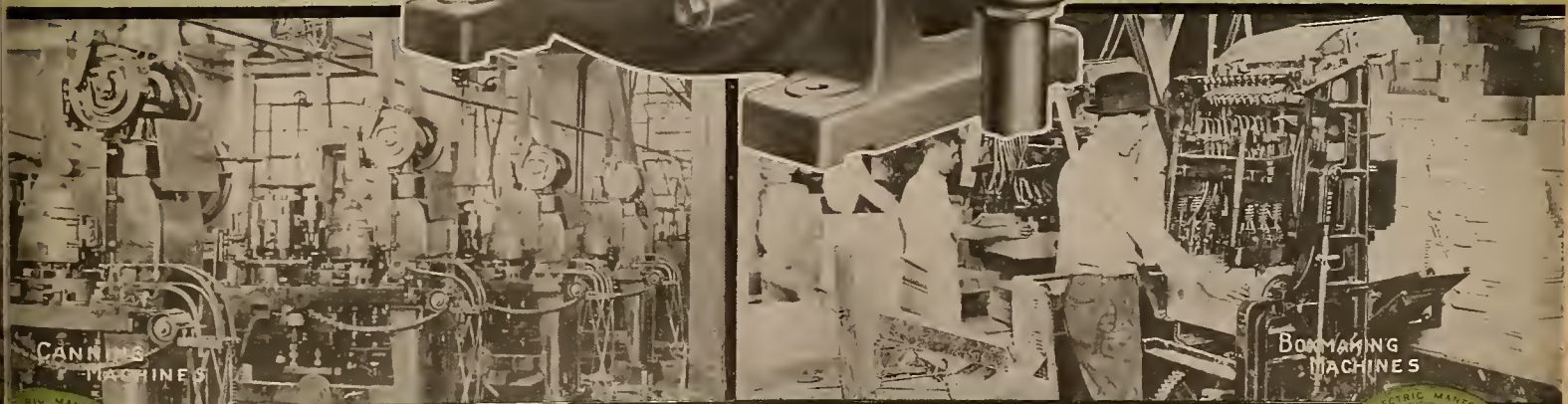
FIFTY-FOUR motors, comprising 230 horsepower in Wagner, Quality design are installed in the Sacramento plant of Libby, McNeill & Libby. They range in size from 1/6 to 25 horsepower and drive the various conveyors, extractors, pumps, printing and boxing machines used. For such service, where untrained help is employed and where steam and moisture are extensively introduced into the manufacturing processes, the simplicity and ruggedness of Wagner motor construction are of particular significance.

Wagner Electric Mfg. Co.



THE new Pow-R-full polyphase motor is the latest Wagner, Quality design to be offered to western industry. It is perfectly ventilated (Wagner motors were the original "directed draft" motors). It is silent in operation, has most liberal bearings and insulation, an exceptionally heavy shaft, and the greatest rigidity of construction throughout. Send for Bulletin 129 which gives the details.

St. Louis, Mo., U. S. A.



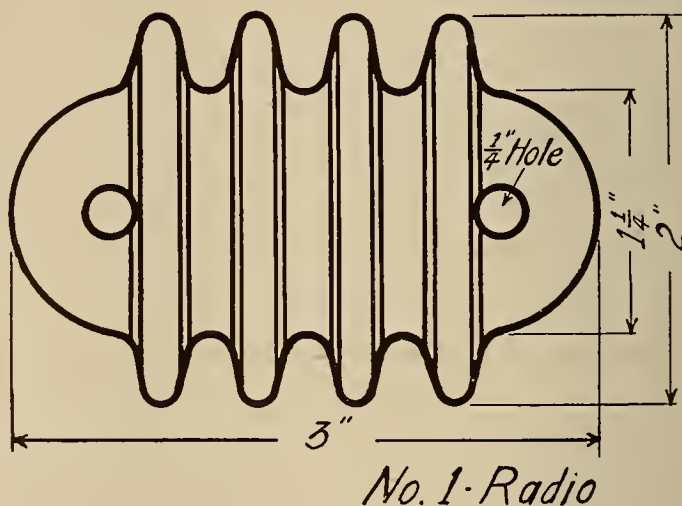
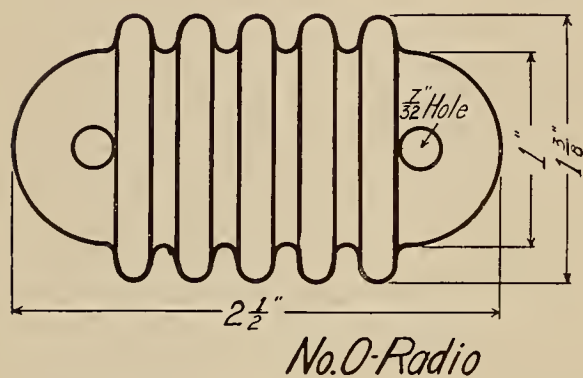
Wagner Quality **Pow-R-full Motor** Wagner Quality
Polyphase



A New and Approved Type of

RADIO INSULATORS

"MACOMB"



Made in three sizes, of pure white vitrified porcelain, brown glazed.

No. 0—For Receiving Stations

No. 1—For Receiving and Sending Stations

No. 2—For High Power Sending Stations

Factory production is unable to keep pace with the demand. Place your order now.

Pacific Coast Distributors

Baker-Joslyn Company

330-332 Azusa St.
LOS ANGELES

183-199 First Street
SAN FRANCISCO

2424-28 First Avenue South
SEATTLE

Journal of Electricity and Western Industry

A McGraw-Hill Publication

Founded 1887

ROBERT SIBLEY, Editor

VOLUME 48

SAN FRANCISCO, JUNE 15, 1922

NUMBER 12

Contents

EDITORIALS 473

The Fifteen Billion Dollar Market in the West—The Cheapest Power Rates in the United States—Where Men of Vision Made History for the West—The Passing of the Wireless Furor—Why Pay Freight on the Water Content of Green Timber?—Gas By-product May Save Fruit Industry From Frost—Getting More Out of Crude Petroleum—Textile Plants and Their Difficulties—The Entering Wedge to Re-vamping Anti-trust Laws.

PROBLEMS THAT CONFRONT THE WESTERN INDUSTRIAL EXECUTIVE—by Robert Sibley 479

A Cross-section of the Industries of the West Shows that Development Depends Upon the Solution of Such Questions as Transportation, Labor, Taxes, Markets, Tariff and Waste.

A FIFTEEN BILLION DOLLAR MARKET FOR EQUIPMENT AND SUPPLIES 486

A Detailed Analysis of Western Expenditures Shows That Some Fifteen Billion Dollars Will be Spent by Thirty of the Major Industries of the Eleven Western States Within the Next Ten Years.

POWER NEEDS OF 6,227 MAJOR INDUSTRIAL PLANTS OF THE WEST 498

A Personal Questionnaire Directed to Six Thousand Plants in the West Indicates that Over Eighty Per Cent of the Power Used Is Electric and that Two-thirds of All Power Is Purchased From Power Company Lines

INTER-INDUSTRY COOPERATION KEYNOTE OF LOS ANGELES CONVENTION 503

Industrial Conference Proves Climax of Sixth Annual Convention of the Pacific Coast Electrical Association at Los Angeles, May 31-June 1. Industrial Men Warn of the Danger of Radical Legislation.

Western Comment on Current Events	476	Western Dealer, Jobber and Agent	513
Builders of the West—W. R. Putnam	478	Activities of the West	516
Power Projects Planned for West	495	Meetings of Interest to Western Men	519
Where and How the Western Power Companies are Spending One Hundred Million Dollars a Year in New Developments	496	Personals	520
Self Improvement in Salesmanship	509	Manufacturer, Dealer and Jobber Activities	522
Eliminating the Waste in Industry	511	Business Outlook in Western Market Centers	523
		Construction News and New Industrial Developments	524

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY OF CALIFORNIA—Rialto Building—SAN FRANCISCO

James H. McGraw
Chairman of Board

Robert Sibley
President

H. A. Lewis
Vice-President

H. W. L. Gardiner
Vice-President

C. M. Lindsay
Sec'y-Treas.

WASHINGTON, Colorado Building
CHICAGO, Old Colony Building
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, 10th Ave. and 36th St.

McGRAW-HILL CO., Inc., New York
Publishers of
American Machinist—European Edition
(Published in London)
Electrical Review and Industrial Engineer
(Published in Chicago)

Chemical and Metallurgical Engineering
American Machinist Ingenieria Internacional
Electrical World Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation Engineering News Record
Coal Age Electrical Merchandising Power

Subscription rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, \$2.50 per year. Elsewhere, \$4 Gold. Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1922, by McGraw-Hill Company of California. Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

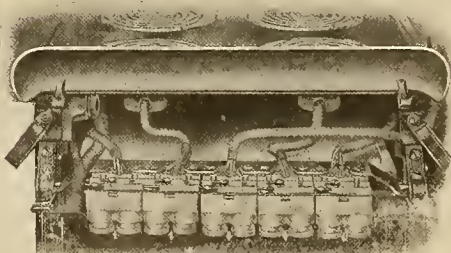
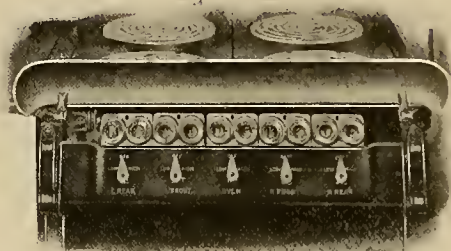
Member Audit Bureau of Circulation.
Printed in U. S. A.



for
AMAZING
SIMPLICITY



take, for example, the Crawford Switchboard



CONTRAST this with all the other range switchboards you ever saw. Above is the board as it appears in the kitchen, sheltered by a broad nickel rail, with all heat control centralized, and clean, tell-tale switch-buttons to make operation "cook-proof."

At the left—the nickel rail swings up and stays put, revealing the fuses. Each unit is individually fused, and each fuse can be renewed in a moment—no dismantling or tinkering, no time, temper or good-will lost in servicing.

By removing the switch-buttons and turning two simple clamps—with your hands,—not tools—the switchboard front swings down on its journal, so you can readily examine the switches.

Swing the whole switchboard forward: behold! Six insulated cables lead away into the range: five to the units, the sixth is the main feed. To illustrate Crawford simplicity, just disconnect all six plugs. Now lift gently—and the entire electrical equipment of the range will come out.

That's real simplicity.

WALKER & PRATT MFG. CO.
BOSTON

Pacific Coast Representative:
BURTON Y. GIBSON, San Francisco

DISTRIBUTED BY

Western Electric Company
INCORPORATED

SAN FRANCISCO

OAKLAND

LOS ANGELES

Journal of Electricity and Western Industry

A McGraw-Hill Publication

ROBERT SIBLEY, EDITOR

Associate Editors

Norman S. Gallison

Clotilde Grunsky

George C. Tenney

Vol. 48, No. 12

SAN FRANCISCO, JUNE 15, 1922

Per Copy, 25 Cents

The Fifteen Billion Dollar Market in the West

BACKED by an analysis in which the fifty-eight power companies of the eleven western states and the executives of some six thousand industries have taken part, the Journal of Electricity and Western Industry on other pages of this issue sets forth in detail the program of development that faces the eleven western states during the next ten-year period.

This survey indicates that fifteen billion dollars will be spent in the eleven western states in capital investments during the next ten years! The major items of this forecast, such as a building program for homes, business structures and industrial plants of \$4,200,000,000, a factory equipment pro-

gram of \$3,400,000,000 and a hydroelectric program of \$1,000,000,000 are of tremendous interest to those seeking industrial markets in the West.

The figures of the last decennial census reveal the strides which the western states have taken in population, manufacturing progress and economic wealth. Indications are that the development of these states will progress with increasing vigor and renewed intensity. The West is destined to be the equal of the eastern states in every way, and with the inception of the tremendous programs outlined herein, it is inevitable that one of the great industrial markets of the world will develop in this district in the next decade.

The Cheapest Power Rates in the United States

THE intensive research compilations that have been undertaken by the Journal of Electricity and Western Industry and which are portrayed elsewhere in this issue bring out one forceful and encouraging conclusion to Western users of electrical energy in the Pacific and Mountain States—the eleven Western States of America—namely, that they enjoy the cheapest power rates prevailing anywhere in the nation. On the basis of the cost to the consumer per kilowatt-hour generated, the rate in the different sections of the nation are as follows: New England States, 2.82 cents; South Central States, 2.65 cents; Atlantic States, 2.09 cents; North Central States, 1.82 cents; Pacific and Mountain States, 1.57 cents; with the average rate of California as reported by the California Railroad Commission of 1.42c. per kilowatt-hour. Thus the average rate for the United States as a whole is 2.17 cents, while the average rate in the Pacific and Mountain States is 1.57, with California showing the lowest rate of all, 1.42 cents. In view of this fact it is rather startling that an attempt should be made in California to place the further development of its hydroelectric resources under

a questionable and untried system when the present system has given the cheapest power rates available in the United States.

Where Men of Vision Made History for the West

THE recent Pacific Coast Industrial Conference held under the auspices of the Pacific Coast Electrical Association at Hotel Ambassador in Los Angeles was one of the most inspiring meetings ever held in the West. Not only did powerful leaders of the electrical industry, such as Wigginton E. Creed, John B. Miller, A. M. West, Frank W. Smith, M. H. Aylesworth and a host of others present instructive messages, but leaders in all branches of business life were present to offer helpful suggestions in formulating future policies. It will be well to remember in detail some of these messages such as the warning of Howard A. Beebe, president of the Investment Banker's Association, that lessons of North Dakota must well be borne in mind by the people of California if the gigantic industrial development of the state is to go ahead during the next ten-year period.

The plea of J. A. Teagarden, of the California Farm Bureau, that the agricultural development of

the West demands that the power supply of the past, adequate and sufficient under sound Commission regulation be continued, and that no departure be made into paths untried and experimental, was especially effective.

John D. Fredericks, president of the Los Angeles Chamber of Commerce, delivered a powerful message in which he drove home the idea that "less government in business and more business in government" would make for a greater commercial and industrial West.

Charles F. Stern, vice-president of the First National Bank of Los Angeles and formerly State Superintendent of Banks, showed how the investment of vast sums of money is closely and delicately interconnected with the conservative tendencies and fair play ideals of the people.

And finally, Chester H. Rowell, of the California Railroad Commission, in his plea for sound principles of regulation prevailing in industry, carried to the people of the West a new pledge for security and fair dealing and service to the people.

It was a great day for the West and one in which men of vision acquired new strength for the building of a greater West of tomorrow.

The Passing of the Wireless Furor

IT IS doubtful if history has witnessed a free publicity onslaught more spontaneous and complete than that of the wireless excitement which has captured the American press. In some respects it has accomplished what millions of dollars of paid publicity could not otherwise bring about. It has carried the electrical idea into American homes through channels found otherwise impossible of approach. It has caused a widespread interest in electrical matters and it is believed has encouraged new and practical uses of electricity other than those of amusement.

Now that the public has become accustomed to the novelty of a radio set and the tremendous burst of enthusiasm has somewhat spent itself, it is well to take stock and plan for the future. No industry can last unless built upon a sound substantial basis. All enterprises born over night have their shortcomings, and radio is not found wanting in this regard. The continued success of radio depends upon unity and cooperation on a nationwide basis. Only the most excellent in music, masters of public speaking, and the best of all that is good and wholesome for the home should be broadcasted at stated intervals from a few selected powerful stations in different parts of the nation and none others should be permitted. Thus from small contributions per user, a magnificent service could be rendered and confusion, inharmony and cheapness of the average matter that has been broadcasted would be eliminated.

The electrical industry itself in its actual merchandising plans for radio supplies has likewise suffered an upheaval. Electrical jobbers the country over have cleared their shelves and display windows of standard lines to place on exhibit wireless equipment. Contractor-dealers in various communities

have literally swept aside their former friendly services in electrical appliances and have wildly rushed after wireless sales. All of this must be expected, but radio equipment should be put where it belongs as one of the sane, sound electrical lines that must in future receive its share of careful merchandising the same as other long and well tried electrical specialties.

Why Pay Freight on the Water Content of Green Timber?

THOUSANDS upon thousands of tons of water are annually shipped over the continent stored away in the green timbers that are being forwarded to market before complete curing has been effected. Here is a great opportunity for inventive genius that can devise a means of drying the lower grades of lumber to enable producers to ship to competitive markets by eliminating the moisture content and thus save the paying of freight on water. The resultant good is two-fold. It brings greater profit to the producer and at the same time enables western products to meet competition in market centers where at the present time these products are unable to gain a footing. Possibly this drying problem might be solved by the use of electrically heated kilns supplied with electrical energy produced by the highly efficient turbo-generators taking steam from boilers fired with mill refuse so plentifully available in western lumbering centers. This problem of excess water has caused great inconvenience in another industry, namely, that of petroleum, where the inventive genius of the West has displayed unusual talent in devising means of relieving crude petroleum of its water content. The lumber industry, however, has received little or no attention up to this time in connection with this important problem and it would seem most opportune that thought be given to its solution.

Gas By-product May Save Fruit Industry From Frost

WHILE reports in the press may tend to overstate the loss sustained from frost damage by the fruit industries of California, the growers, especially in the citrus industry, undoubtedly received a severe financial setback. The results of the unusually severe winter have stimulated experimentation in methods of increasing the protection from frost and it is to be hoped that efficient and economical means will be devised. That the answer to the problem is not so far off is suggested by a recent demonstration held near Los Angeles early in April.

The demonstration which was staged by the local gas company featured the use of briquettes, a by-product of manufactured gas, which proved more effective than smudge pots in protecting fruit trees against low temperatures and will probably prevent damage in extremely cold weather where the oil-smudge pots have failed. Where much of the protection from "smudging" has depended upon the blanket of heavy vapor and smoke and less on the direct heat in proximity to the trees, the success of bri-

quettes is predicated upon an efficient distribution of the heat rays and less on the smoke. In fact, where the smoke is now a nuisance in many cases the carbon briquettes seem to offer complete relief.

The "electric spot heater" has done much to prove the efficiency with which heat waves may be reflected as contrasted with the older attempts in space heating. The gas industry has also developed a counterpart for the electric spot heater in which they utilize an incandescent burner heated by gas.

Costs involved in frost prevention often run into large figures as the fruit crop may be valued at \$1,000 to \$2,000 per acre and in addition there is often the hazard of losing the entire orchard.

If new methods can be injected into the business of protection from frosts—because it is a business by itself—which will partially relieve the western fruit industry of the frost menace, another big step forward will have been recorded.

Getting More Out of Crude Petroleum

A PROBLEM directly affecting the saving of waste in industry is that of obtaining a greater proportion of the higher fractions of petroleum, especially gasoline, from a barrel of crude oil. This involves the substitution of scientific methods based upon careful research for the rule-of-thumb methods of the pioneer refiner. In the days of over-production the fuel market was largely supplied by crude oil from the well, only the lighter gravity oils being used in refining. At present the fuel market is supplied with the residuum from the refineries. The increasing demand for gasoline has necessitated changes in refinery practice whereby the heavier crudes formerly considered as only fit for fuel are now being "cracked" to yield their proportion of gasoline. With the passage of time and the increasing popularity of the automobile the public is being impressed with the fact that petroleum is one of our most valuable natural resources and any research to devise a method whereby a greater proportion of the volatile products can be extracted from the crude oil is a step toward true conservation.

Textile Plants and Their Difficulties

PORTLAND, Oregon, has rapidly risen to a place of national repute among the textile centers of America. Particularly is this true of its woolen mills. There are problems, however, that must be solved relating to the marketing of the products of these mills in order that this industry may further prosper. In the first place it is unfortunate that western centers are so far removed from the center of styles and away from personal touch with buyers. This brings about a difficulty in finance owing to long term credits necessary on account of the extended period occupied by the goods in transit. Moreover the very fact that these western cities are so far removed from the market centers causes further difficulty in obtaining credit information which is

reliable and which will protect the shipper from possible loss. Many firms, for instance, may be sound financially at the time goods are ordered, but involved in financial difficulties at the time the goods arrive, since usually thirty-day periods expire during the time of transit. Here again it would seem that co-operative marketing for which the West, particularly California, has become so noted, must be developed to an even higher degree of perfection by banding together into cooperative selling organizations in sufficient force to overcome these obstacles in the matter of styles, contact with buyers, and long time credits. It is possible that by adopting similar tactics the textile industry may find a solution for its difficulties.

The Entering Wedge to Re-vamping Anti-trust Laws

SENATOR Edge of New Jersey recently introduced a bill which is designed to promote the assistance of Congress to Trade Associations. The Senator has also introduced a resolution to consider the proper relief in order that trade associations and cooperative business societies may continue to function. He believes there should be a wider public understanding of such associations and the difficulties that confront them. The Senator, it is understood, feels that Congress has dealt liberally with farmers' associations, and that the same interest should be manifested in business organizations.

The bill provides in part that every trade association, unless excused by the Federal Trades Commission, shall file with the Commission a statement of its general character and proposed activities; a complete list of names and addresses of its members, officers, directors, committees or other managing agents, together with a true copy of its constitution, of its by-laws, and of the minutes of all meetings, all resolutions and all agreements between members of the association.

Each trade association shall also file all statistics collected by it. Any trade association may request from the Commission a specific ruling with respect to the legality of its plan of organization, as expressed in its constitution and by-laws.

This bill is the first step in securing a re-examination by Congress of the economic and legal foundations of the anti-trust acts—an inquiry sadly needed.

RADIO BULLETINS

The Journal of Electricity and Western Industry broadcasts a special industrial and business news report each Monday night at 7:30 o'clock, both from San Francisco and Portland. The San Francisco report is broadcasted from station 6XAC, operated by the Colin B. Kennedy Company at Los Altos, California. The Portland report is sent out by the Northwestern Radio Manufacturing Company from station 7XF. Both reports are broadcasted on a wave length of 360 meters.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

The lifetime hopes of the late David H. Moffat, capitalist and empire builder will be realized when construction starts on a tunnel through the crest of the crest of the Rockies, uniting the eastern and western parts of the state of Colorado. Moffat devoted a large personal fortune and several years of his life to the construction of what is known as the "Moffat Road," but died before its completion. The road as now constructed crosses the mountains at an elevation which makes operation impossible during the winter months owing to heavy snowfall. Governor Shoup of Colorado signed a bill on May 12th which will permit the road to function as a link in the transcontinental route from the Pacific Coast. The proposed railroad and tunnel construction is entirely within the state and consists in utilizing the present Moffat Road, tunneling the mountains for six miles at an altitude of about 9000 feet, and extending the road on the western side of the mountains to connect with the Denver and Rio Grande. It is estimated that the amount of money required will approximate nine millions of dollars, which will be raised by a bond issue secured by certain properties within the state, the procedure being similar to an issue of irrigation or other utility bonds. The state of Colorado will benefit immeasurably by the construction of the tunnel, which will open up for development rich tracts of land, hitherto lacking in transportation facilities.

Governor Signs Bill Authorizing Moffat Tunnel

Taxation and the fact that railroad managements can neither control income or expenses are two of the most difficult problems facing the railroads today according to Guy V. Shoup, general counsel for the Southern Pacific Company in an address before the Pacific Traffic Association in San Francisco recently. Mr. Shoup said in part:

Taxation Hampering Railroads

Mr. Shoup said in part:

"The principal difficulties of railroad transportation arise out of the fact that railroad managements cannot control either the income or expenses of their companies. Their income is fixed by the Interstate Commerce Commission and the various state commissions. The wages, hours and working conditions of their employees are fixed by the United States Labor Board.

"While the Transportation Act requires the Interstate Commerce Commission to endeavor to fix rates so as to insure the carriers the return of six per cent upon the fair value of their property, it does not guarantee any such return to the carriers. Although the Interstate Commerce Commission endeavored to fix rates which would bring such a return, the depressed condition of business has been such that none of the principal carriers of the country have been able to earn the return which the Transportation Act contemplates they should earn. In fact the managers of the railroads

throughout the country generally have been at their wits' end to find a means to reduce expenses of operation in order to avoid bankruptcy.

"Their difficulties have been further enhanced through competition via the Panama Canal and the competition of motor trucks and buses.

"The future of the railroads is also gravely menaced by the increasing burden of taxation and there seems to be no limit to which the taxing power of the state will go in this direction.

"The experience of the Southern Pacific Company in California is typical. In 1912 the Southern Pacific Company paid in state taxes in California alone, \$2,451,897.04 which was equal to 10 per cent of its net revenue. In 1921 the tax levied upon the Southern Pacific Company by the California Legislature was \$8,143,828.38, which was equal to 28 per cent of the company's net earnings. The power to tax is the power to destroy and the figures herein given clearly indicate the recklessness with which taxes are imposed upon the chief tax payer of the state.

"All that the Southern Pacific Company asks is that it be required to pay only its fair share of the taxes and that taxes themselves be kept within legitimate bounds.

"In view of the present situation it is not amiss to call attention to the proposal of certain theorists that the indebtedness of this state be increased by another issue for \$500,000,000 for the purpose of vesting in certain state officials the control of the water power industries of this state. It should be apparent that the legitimate financial burdens of the state at present are sufficiently heavy without embarking upon any socialistic experiment as that proposed with all the attendant evils that are bound to follow in its train."

After a ten months' trial, jitneys were emphatically repudiated by the people of Spokane who declared for street cars in a special election May 2, by a more than two to one vote. The question submitted to the people was whether certain charter amendments, which would permit the consolidation of the two present street car companies on a basis worked out between the city commissioners and the two companies, should be approved.

Spokane Frees Streetcars from Jitney Competition

The passage of the amendments has already had an excellent effect. Building and loan companies have begun loaning again for the first time in months in those districts in outlying sections of Spokane where jitney competition had either shut out the street cars or threatened to eliminate them. Jitneys are to cease operation on December 31 of this year.

Meantime the Washington Water Power Company and the traction line interests have joined to form the Spokane United Railways. The capital stock is placed at \$3,500,000 of which \$1,500,000 will be common stock and \$2,000,000 will be 7% cumulative preferred stock. This company is to take over the two existing companies, eliminate a considerable amount of parallel lines and join the two systems. On June 30th, under the agreement with the city commissioners, the present fare of 8 cents is to

be lowered to 6 cents and a universal transfer system established. School children will be carried for four cents. In return, certain concessions as to the paving and upkeep of streets and bridges are made in the new charter to be granted by the city.

The Chamber of Commerce of Portland has named as its major effort for the next fiscal year the "Up-building of Oregon." The Chamber recently came out in its official publication frankly admitting that according to the last census that Oregon had lagged. Some high spots of the report by the board of directors follow:

"Oregon has the most extensive and unused and undeveloped resources of any western state.

"Oregon is making the slowest progress in population growth and material population of any western state.

"There can be but one conclusion from these undisputed facts: The state of Oregon as a whole is not properly organized to realize upon its own natural wealth.

"Portland can make no greater increase within her own bounds, through any line of effort, than by taking up energetically, forcefully and continuously the development of the resources of the state and immediately tributary territory.

"The last census figures prove the need of the work, all Oregon knows the opportunity, and it is the simplest business formula that in view of the fact that progress is inadequate, Portland must put her shoulder to the wheel in the direction of a more complete state settlement and industrial development."

After spending much time on the facts within reach, the directing power of the Portland Chamber has reached the conclusion that the city must take a more active part in state work. Before undertaking this work, in fact before trying to plan, it was felt necessary to gather the fullest possible inside data on the sound modern business methods that have been adopted to improve the condition of the producer in other western states. This preliminary work the Chamber has authorized. It is to be prosecuted immediately and vigorously.

Greater than seasonal increases in activity in the major extractive industries of the district, continued strength in the banking situation, and a period of comparative dullness in whole-

Conditions in Twelfth Federal Reserve District sale and retail trade characterized the past month, according to the recent report of business and agricultural conditions in the

Twelfth Federal Reserve District. According to the report, improvement in the lumber industry was the outstanding feature. Production during April was at 95 per cent of the estimated normal capacity of reporting mills and during the first two weeks of May reached normal capacity. Orders received during April exceeded production 27.1 per cent, this being the fifth consecutive month in which demand has exceeded current production. The mining industry is reported to be more active than at any time in the past year. Gold and silver mines with the richer ore deposits, and which have been closed down, are being worked again, and 12 of the 16 large copper companies are now in operation after a year of comparative inactivity or of complete cessation of operations. Petroleum production continues at record

levels but consumption has been lagging behind output, and stored stocks on May 1, were 39,795,057 barrels, the largest amount since April, 1917, and 56.9 per cent greater than one year ago.

Deciduous fruit orchards, with the exception of apricots, are in good condition. Fairly accurate estimates of the damage done to the California orange crop by the January frosts are now available and it is expected that approximately 58 per cent (13,050,000 boxes) of the previously estimated crop will be marketable. Prices of agricultural products were relatively stable during April and the gains of the previous three months were generally held.

The volume of business transacted in the district, as reflected in reports of debits to individual accounts in 20 principal cities was practically the same in April, 1922, as in March, 1922, and April, 1921. The number and liability of business failures, although large, was less than in the previous month.

Employment in the district is increasing rapidly as industrial activity increases and seasonal farm and construction work is begun.

Increased activity in industry and agriculture is reflected in the loans and discounts of reporting member banks which increased from \$834,264,000 to \$853,231,000, or 2.3 per cent, during April.

By far the majority of the building permits which have been issued in the various western cities in the past few months are for residence construction. The

Costs of Building Home Possible to Average Man long period of restrictions followed by the industrial depression caused such an acute condition throughout the country that for many months the housing shortage, coupled with consequent high rents was a major problem with many families. Costs appear to have been reduced so that a home is now within reach of the man of modest means, and the predicted building boom seems well under way.

A western newspaper, which is urging that from the economic and social standpoint there is no more important question before the average man than the building of a home, recently published figures which may be taken as representative.

The following is within reach of the man who is paying twenty-five dollars a month rent, provided he has enough for a modest initial payment.

Value—	Cash Pay't	Install. per mo. Inc. Interest at 7% per annum	Pays in
\$3,500.00 4 rooms.....	\$ 250.00	\$25.00	200 months
3,500.00	500.00	25.00	180 months
3,500.00	500.00	30.00	136 months
4,000.00 5 rooms.....	\$1,000.00	30.00	136 months
4,250.00	500.00	32.50	163 months
4,750.00	1,000.00	32.50	163 months

It was further stated that a good four-room house with best of material and modern conveniences can be built for \$3500—\$250 down and \$25 a month, land from 25x100 feet to 25x120 feet, all street improvements paid for, lot stands 20 per cent of cost and house 80 per cent.

For from \$4,000 to \$4,750 a modern five-room bungalow can be built with hardwood floors, shower bath and breakfast nook.

Builders of the West

ACCIDENTS, when defined as "events that take place without one's foresight or expectation," often play an important part in the shaping of human destinies. The electrical industry of the nation has been influenced by a fortuitous event which occurred in Red Wing, Minnesota, on May 1, 1899. It is doubtful if this event has been previously chronicled as such. However, when W. R. Putnam, president of the Northwest Electric Light and Power Association, after being educated for the banking business, by accident became manager of a small electric property at Red Wing, Minnesota, the electrical industry of the West and the nation was greatly influenced by this and succeeding events.

Aside from the impress of his character and personality, the electrical industry has perhaps been influenced with regard to methods of merchandising electric ranges, more by the work of Mr. Putnam than by any other figure in the industry. Previous to his contribution, accurate data as to operating costs were unavailable. As chairman of the Electric Range Committee of the Northwest Electric Light and Power Association, he rendered a report which surpassed any previous work on the subject and was the first comprehensive document giving accurate data on costs, methods of merchandising and cost accounting of electric ranges. This work attracted such wide attention that he was appointed chairman of a similar committee of the National Electric Light Association, and the report of his committee stands as a classic in its field.

Mr. Putnam attended the public schools of Minnesota and after being graduated from the State University spent two years as bookkeeper and utility man in a Minneapolis bank. He then spent ten years as manager of the Red Wing Gas and Electric Company, securing the usual advantages that accrue to the small company manager, in being required to act as meter man, billing clerk, purchasing agent, bookkeeper, designing engineer, construction foreman and general utility man around the plant and system. During the four years of this period he was chair-



W. R. PUTNAM

who as vice-president and general manager of the Idaho Power Company and president of the Northwest Electric Light and Power Association has contributed much to the development of the electrical and industrial West.

man of the Republican County Central Committee, and chairman of the state committee, securing a liberal education along those lines. The next ten years of his experience were spent with several electric interests in the middle western and intermountain states. As general superintendent of the Menominee and Marinette Light and Traction Company he changed a combination direct and alternating current system over to alternating current, and superintended hydroelectric construction as general manager of the Dakota Power Company, at Rapid City, South Dakota.

As sales manager and commercial manager for the Utah Power and Light Company at Salt Lake, in addition to developing cost data and operating records for appliances, Mr. Putnam was in charge of all publicity work in the state of Utah in connection with the various Liberty Loan

drives. In 1919, Mr. Putnam left Salt Lake City to become vice-president and general manager of the Idaho Power Company, which position he has since held.

Throughout his entire business career he has been very active in association affairs, being one of the organizers of the Minnesota Electrical Association, acting for several years in the Wisconsin Electrical Association, and serving as chairman of the Electric Range Committee of both the National Electric Light Association and the Northwest Electric Light and Power Association, of which latter organization he is now president.

In the eyes of those who have carefully followed the upbuilding of electrical and industrial matters in the West, Mr. Putnam stands forth as the one who has contributed most to processes connected with electric range sales, and proper cost accounting in appliance sales handled by utility companies.

Hence, to W. R. Putnam, engineer and executive of outstanding attainment in promoting the uses of electricity in the home, this issue of the Journal of Electricity and Western Industry is affectionately dedicated.

Problems That Confront the Western Industrial Executive

A Cross-section of the Industries in the West Shows That Development Depends Upon the Solution of Such Questions as Transportation, Labor, Taxes, Markets, Tariff and Waste

By ROBERT SIBLEY

Editor, Journal of Electricity and Western Industry



IN considering the industrial field in the eleven western states in its broadest aspects—a field producing annually manufactured products of \$3,450,000,000 in value—it must be divided into two great branches—extractive and manufacturing. In the former will fall the principal industries—lumbering, mining, petroleum refining, fishing, slaughtering and meat packing, grain milling, canning and preserving of fruits and vegetables. These branches contribute by

far the greater part of the total value of manufactures in this section.

Thus, recent census statistics show industrial growth in California is progressing at such a rate that this commonwealth is now eighth among all the states of the union in value of manufactured products rising to the substantial total of \$1,981,000,000 per annum. First on the list is petroleum refining amounting to \$213,292,000 annually, with canning and preserving of fruits and vegetables ranking next with an annual value of \$189,956,000, and slaughtering and meat packing fourth with \$92,554,000 annual production.

The second, or manufacturing branch of industry, includes such activities as iron and steel making, shipbuilding and furniture making. The aggregate annual value of these products is small compared with that of the extractive branch of industry, although the various metal trades industries produce annually the enormous sum of \$400,000,000 or 20 per cent of the entire manufactured output. It has always seemed to the careful observer that these distinctions are not sufficiently comprehended in the general run of promotion campaigns for the development of industry in the West. If they were, the paramount importance of agriculture and the other extractive industries in California and the West generally would be more widely recognized. It would seem, then, that the future prosperity of western industry depends primarily upon increasing prices for the basic raw materials of commerce, since the products of the West largely constitute these basic raw materials. This, of course, is dependent upon world forces and nothing which the West alone can do can hasten it. However, the distribution and marketing of farm crops, the readjustment of freight

rates, the bettering of farm credits, including both loans upon land and credits for harvesting, carrying the crops and heading off legislation unjust to private enterprise, are factors of the utmost importance in the economic marketing of our products.

Hence, the most important economic handicap under which the West labors at the present time may be summed up as the problem of marketing the basic native products. We have a great many products for which we have unique production advantages. We have solved, or can solve, most of the questions relative to production methods, but the markets are distant and are as yet but partially developed, hence they are unstable and marketing costs are high. It is doubtful whether these problems can be or should be solved by legislation or any other kind of social action. It is possible that they may be solved by some method of cooperation, but it is to be hoped that it will be self-created cooperation as in the case of the citrus products rather than any form of state tempered cooperation. Industry should be let alone to work out its own salvation.

On the other hand, the greatest problem facing our manufacturing industry, in contradistinction to the problems of marketing in our extractive industries on the Pacific Coast, is one of effecting economy in the production of a basic product, and its solution consists in finding in this western country good coking coal or to devise a commercially profitable means of refining iron ore without the use of coking coal, to the end that our raw material costs shall be equal to or less than those of the East. In or near California are great deposits of high grade iron ore easily available for mining and transportation. But nature has not supplied us with one of the essential elements for refining, namely, good coking coal free from sulphur. Attempts have been made to use electric current and oil in this connection. So far as can be ascertained commercial success has not yet been achieved in any of these attempts. The climatic conditions of California and other districts of the West lend themselves most favorably to the manufacture of all kinds of metal products. It is possible to carry on work under the most economical conditions at all seasons of the year, in contrast with the tremendous seasonal handicaps of the iron districts of Pennsylvania, Ohio, and West Virginia. With no higher cost of other raw materials in her manufactured products the West can undersell the East in its own growing markets and in the vast potential markets of the countries bordering the Pacific. We are reliably informed that another year will not pass before active steps will have been taken to bring to fruition this great hope of an iron industry in the West.

Let us next examine in detail some of these production and marketing problems. In order that we may build for the future on a firm foundation, we must produce quality products at a cost of production that makes it economically possible to reach the markets of the world, and at the same time conserve our vast natural resources so that our building may not be for this generation alone. This conservation must extend to the sea as well as to our land resources. Consider the salmon, halibut, and herring fisheries, the whale and other marine mammals that contribute vastly to our western resources, as well as our timber and mineral resources. Above all these things is the subject of water conservation. Not only is water of inestimable value for domestic or manufacturing use in our great cities, but its use in irrigation, its proper storage to avoid damage from floods, and finally its possibilities for generating electric power to drive the wheels of industry in the West are of great importance.

Eliminating the Waste in Production

Herbert Hoover in his book entitled "Waste in Industry" has vividly pictured the wastes that go on in American industry and the necessity for eliminating this waste. This is of such prime importance that additional reference to this subject should be made here in the West. Eliminating the waste in industry is one of the ways whereby western production may be bettered. There are many instances that may be cited but two particular cases are chosen, not because they are more outstanding than others but because of our general familiarity with them and of their ease in understanding. We have been so lavishly endowed with blessings in abundant raw materials as not to feel the urge to conserve our natural resources. Take the lumber industry as an example. This industry is today behind nearly all others in applying modern research methods in the solution of many problems in waste prevention already solved in other industries. Wasteful methods are still to be found in logging, and wholesale waste is evident in reclaiming the by-products such as slabs and refuse. A hopeful sign appears, however, in the electrification of this industry and the utilization of by-products heretofore discarded as useless as fuel. When it is remembered, for instance, that the present annual waste in the great lumbering industry of the Northwest through the non-utilization of refuse material alone represents energies as great as the present total annual production of hydroelectric power in California, some conception as to the enormity of this waste may be obtained.

Another instance of present day wastes that can be avoided is found in the petroleum industry. Over-production in petroleum has resulted in California when industrial conditions have curtailed the demand for oil as a fuel. This is due largely to the necessity for drilling wells under agreements with owners of the land, or as a matter of protection against adjoining ownerships, thus causing an economic loss in development—reasons that the public as a whole does not deem sufficient justification for the waste involved. Again, in the drilling of wells operators have

failed to give careful attention to economic spacing—the maximum acreage which should be allotted to a well in order to insure maximum recovery at minimum cost. The speculative and haphazard development at Huntington Beach in Southern California is a case in point in which wells have been so closely drilled in groups that they cannot possibly pay a profitable return. Standardization of materials used in development would also be advantageous. This is especially true in connection with the increasing use of the rotary system of drilling. The diameters and weights of casing used in rotary holes are those originally developed for drilling with cable tools. The sizes of casing are not adaptable to the most efficient rotary drilling practice and waste in time and material is the result. Greater efforts should also be made to minimize waste of the lighter fractions of crude oil, chiefly the loss of gasoline through evaporation from improperly sealed storage from the time the oil leaves the well until it arrives at the still in the refinery. Natural gas should be more carefully conserved underground and not wasted above ground. Where economically possible, the natural gas should be run through absorption plants and relieved of its gasoline. The dry gas should thereafter be used as fuel. These instances have been given in detail in order that the point may be driven home as to how small economies go to make up a gigantic total of bettering industry in the West.

Not only are our industries in the West behind in eliminating the waste involved in handling inanimate materials, but in those questions involving human labor we have much work ahead. Particularly is this true in the matter of executive control. Our manufacturing industries have arisen over night, as it were, and the development of some scientific method of training executives and efficiency men to operate these great industries is a crying need of the hour. This is not intended as an indictment of the lumber industry or the petroleum industry. In both of these great industries these instances have been cited purely for illustrative purposes. Valuable contributions are daily being made to better production.

Petroleum has in large measure filled the need for fuel in California due to the scarcity of coal, and yet greater efforts should be made to extract a larger proportion of lighter fractions of petroleum, especially of gasoline, in order to put this product to its greatest use. This involves the substitution of scientific methods based upon careful research for the rule-of-thumb methods of the pioneer refiner. Some years ago in the days of over-production the fuel market was largely supplied by crude oil from the wells. Only the lighter gravity oils were used in refining. At the present, due to scientific methods put into practice in California, so-called fuel oil is a refinery product from which all of the lighter fractions have been extracted. Increasing demands for gasoline have necessitated changes in refinery practice whereby the heavier crudes once considered only fit for fuel are now "cracked" to yield their quota of gasoline and this process of refining crude petroleum

and putting it to its highest use has only begun in the West. When we realize that a barrel of crude petroleum of forty-two gallons sells on the open market for, say, one dollar and fifty cents and that every additional gallon of gasoline recovered from this crude petroleum by application of better refining processes sells for twenty to twenty-three cents, the importance of these economic savings can be seen.

Overcome Ignorance of Business Principles

Much of the present industrial depression in the West is due to ignorance of business principles and the consequent weakening of credit that our industries may acquire in the business world. The ills prevailing in the cattle industry are quite typical of the western industrial situation in both the extractive and manufacturing industries, more particularly in the former. In the cattle industry it is found that there is a great need for some system for the extension of credit for a sufficient length of time to accommodate the farmer's needs and to keep him from the grasp of unscrupulous money lenders who take advantage of times of stress to call their loans and precipitate ruin upon the unfortunate borrower who, as in the recent depression period, cannot promptly meet his obligation. The matter of marketing is closely allied with that of credit, as the livestock industry is now showing the effects of enforced marketing during the past eighteen months which was stimulated by the lack of credit and the calling of farmers' loans. The farmer and stockman can always make money year in and year out if they have a market for their products and if returns from their sales are not rendered indefinite by reason of violent fluctuations brought about by heavy marketing at one time and light marketing at another.

This situation could be vastly bettered if farmers would apply business principles to their operations, and in the livestock business it is particularly true that few stockmen know how much they are making on the capital actually invested or what their limitations are or should be in order to make the proper return on the capital. They do not keep accounts as a general rule except in a small vest pocket book or in their check stubs and seldom know what their overhead expense is as compared with their capital investment or at what rate their property is returning a profit upon the operations. Further, it is very difficult to get a true and accurate statement from farmers or stockmen on their financial condition for the reason that so much information is carried in their heads or in vest pocket notebooks. This is a condition which has been more noticeable since the organization of the Federal Reserve Bank and to which serious thought should be given.

It is not necessary for farmers to organize any union such as labor has, or to ask for or receive any special favors at the hands of state or national legislatures, or that they should be placed in such a position that they could create a monopoly on the production and sale of all foodstuffs. Unquestionably, their situation has never had proper attention in the past and it is going to become necessary to educate

the young man taking up agriculture along scientific lines so that he may be able to gage accurately the extent of operation and production which he may undertake and to know, through his accounting, whether or not this production is earning him a proper return on his capital invested. Thus, he may make the same financial showing as does the manufacturer and be able to finance his operations at rates of interest not excessive and from sources which are not subject to arbitrary action in times of stress.

Adequate Banking Credit for the Farmer

Even with the adoption of sound business principles by those engaged in agricultural industries there still remains the lack of ample credit in times of financial stringency. One solution suggested is extension of the scope and powers of the Federal Land Bank so that long time loans may be furnished to agricultural producers at a low rate of interest, the principal of such loans to be amortized over a long period of years. This development can, of course, go on only through the stabilizing of the agricultural industry through the increasing application of scientific methods in the selection and handling of land and its products. The success on the continent of Europe in prewar times of the great mortgage land banks shows what may be accomplished by the stabilizing of the agricultural industry. The recent, and as yet modest, development of the Federal Land Bank shows that investment capital in our country is ready to flow into such channels if an adequate factor of safety is provided the lender.

With this provision for adequate financing, and starting with some assured prospects of success, the intelligent colonist-farmer should proceed on somewhat the following basis: There should be a continued effort for the improvement and stabilizing of the quality of agricultural product and the selection of markets and marketing methods, all looking toward the creation of a proper basis for short term credits. The experience of the past few years, especially since the establishment of the Federal Reserve Bank, has shown that seasonal agricultural credits needed in large volume can be furnished only if orderly, steady and complete marketing and liquidation, which is the basis of such credit, takes place.

There must be some stabilizing influence given to the rapid subdivision of great areas in the West if a self-sustaining, prosperous farming class owning and tilling its property is to be maintained on the land. Whether methods involving government or state aid, like the land colonization acts of California now in operation at Durham and Delhi, or those of privately owned corporations should be employed, is now a question of serious concern, and should be given deep study.

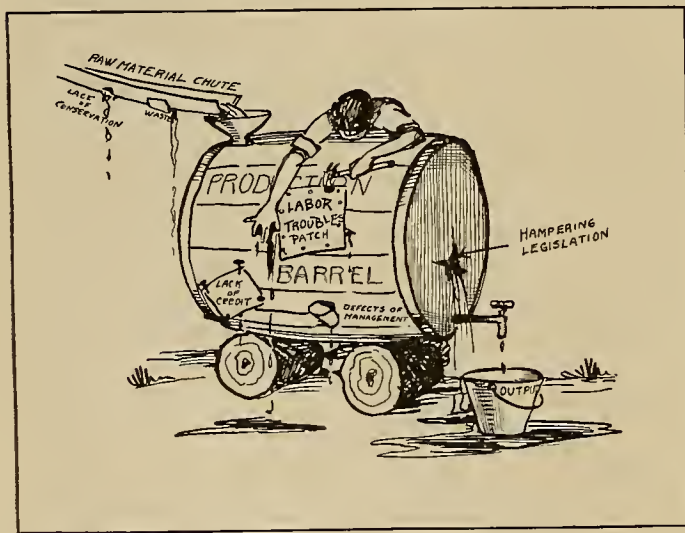
Sympathetic Understanding of Labor

It would seem that the elimination of healthy and fair competition in both labor and commerce has led to regrettable results. It is being demonstrated daily in the building trades that second-rate workmen receive the same rate of pay which skilled men earn. Another bad feature of this situation is the perpetual struggle for either higher wages or shorter hours which increases the cost of production. Seldom

or never is this potential power exerted toward the reduction of the cost of living. The result is to place the industries and the labor of the United States at a disadvantage in competition for international commerce. There is no question that organized labor has improved the condition of the laboring man, and to the extent that organization has brought about a higher moral and intellectual standard for the laborer, inculcated vision and enthusiasm and the spirit of individual effort, just so far has organized labor proved a benefit to the human race. However, the reward for the laborer must bear some definite relation to the cost of living, whether this cost be high or low compared with the 1914 standard. In this way only can the labor problem find complete and satisfactory solution. Great progress has been made in the West along the lines of a better industrial understanding between employer and employee, and as this understanding ripens into a full fruition of purpose to make men—employer and employee—view each other's problems with a sympathetic understanding, a more complete development of the West industrially will take place.

Marine, Transcontinental and Auto-bus Transportation

The transportation problem is three-fold, the development of ocean routes for delivery to markets, the transporting of transcontinental freight and the local competition involved in the auto-bus situation



DON'T FORGET THE LEAK NEAR THE SPOUT

The western manufacturer is busy patching up the leaks which come from unsatisfactory labor relations and defects in management. In the meantime pernicious legislation, unless attended to, will do serious damage to the production system.

both freight and passenger. In one sense there is no transportation problem in connection with the foreign trade of the Pacific Ocean. There are far more ships than there are cargoes and as a consequence the going rates of freight are less than the actual cost of operating the ships. All ship owners are working hard to reduce the cost of operation so that they may be able at least to function without a loss. On the other hand, the question of transportation between western and eastern market centers, over the transcontinental railroads is a vital and pressing problem at the present moment and involves competition with the Panama Canal route.

The increase in freight rates that occurred a year or two ago has had a decidedly harmful effect on certain Western industries.

An Example Is Furnished by the Lumber Industry

The percentage increase in freight rates made effective in the summer of 1920 placed the western lumber manufacturers at a serious competitive disadvantage as compared with the southern pine producers, who since the development of the timber resources of the West have been the principal competitors in the eastern market. Freight rates had been adjusted from time to time with the object of keeping competitive conditions comparatively equal until the adjustment by the percentage method indicated above. This most recent sweeping adjustment gave the southern pine interests an advantage of two to three dollars per thousand feet which is one of the principal reasons why the western lumber industry has been in a decidedly depressed condition during the past year and a half. Our railroads should have sufficient income not only to enable them to operate but also to develop with the growth of the country. However, it is felt that rates should be so adjusted as to put the western industries in an equitable position as compared with eastern competitors. A readjustment of class rates and, in general, a reduction in freight rates is desirable as soon as it can be made.

In the canning industry of the Pacific Coast states a slightly different situation appears. While the Pacific Coast is favored by water transportation via the Panama Canal to large populous centers on the Atlantic seaboard, it is obvious that the necessity placed before the railroad of meeting such competition on their through business, forces them to exact higher rates to intermediate territories which necessarily have a tendency to discourage consumption of coast products in those territories, which are often large markets for these products.

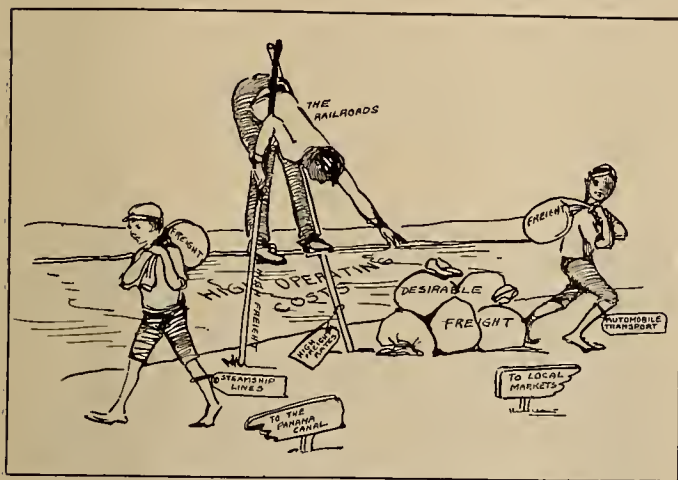
The motor truck situation, particularly in California, also offers a serious situation. It would seem as though the motor truck is cutting off a good deal of profitable local business on railways, while the water carriers are cutting off the longer hauls on new business and upsetting the intermediate haul situation. In view of the fact that the states are providing, through general taxation, the right of way and maintaining it for motor trucks, while the Federal government is assuming a heavy part of the losses of the water carriers, the position of the railways is serious and the carriers are certainly entitled to consideration. Unquestionably, the motor truck should pay for the wear it occasions in the use of the highways whatever that may ultimately turn out to be. Both passenger and freight traffic should be charged with the cost of such service.

The recent investigations at Pittsburg, California, have shown that the type of highway adopted by the California State Highway Commission will not stand up. It is understood that further investigations are going to be conducted in order to demonstrate more thoroughly just what sort of a substitute will meet present traffic conditions. It is equally true that the best model of truck has not yet been developed. For a state which ranks second among all

the states of the Union in the number of its automobiles and which enjoys the advantage of a large local supply of fuel oil for automobile purposes the question of the possibility of motor service in competition with rail and perhaps water haul offers an obviously important problem for solution.

General Railroad Problem is Improving

Summarizing the railroad situation as a whole, there can be no doubt but that it is improving. It is true that the gross revenues of Class I roads for November 1921—the latest available figures—were less than the corresponding revenues for November 1920 by \$126,000,000. The operating expenses of the railroads, nevertheless, declined so that the net railway operating income in November 1921 was \$15,000,000 greater than the income for the same month of the previous year. This is distinctly encouraging. As a matter of fact, the figures for the



HIGH, LOW, JACK AND THE GAME

The railroads must wear high enough stilts to enable them to ford the river of high operating costs, but the high rates make it easy for their competitors to get the freight.

eleven months ending November 1921 show a net income of over \$500,000,000 in excess of the net receipts for 1920. It is true that even this enlarged revenue falls considerably short of the amount necessary to produce an annual return of $5\frac{1}{2}$ or $6\frac{1}{2}$ per cent. Progress is nevertheless being made and there is no occasion for pessimism.

Distressing Situation of the Electric Railways

Still another problem in the local transportation situation is the insolvent situation of the electric railways serving city and suburban districts of the West. These roads, which have in the past been of inestimable value in the developing of western communities, are having the cream of their business skimmed by the auto-bus, to the extent of thirty million dollars per annum in California, with greatly increased costs of operation and practically no advance in unit revenue, and finally with a franchise system that has long since outgrown itself. These franchises in many instances require paving, lighting, sprinkling and sweeping of streets. There is no question but that some uniform and equitable adjustment should be made so that these carriers may pay for what they use of the highways and streets in their operation and nothing more. The proposed amend-

ment upon the November ballot in California to place the matter of franchises under one central body such as the State Railroad Commission is deserving of earnest consideration and offers an opportunity of getting a uniform adjustment of the problem under a state-wide basis of review.

Meanwhile, for immediate relief in the franchise situation, the so-called Fresno Resettlement Plan, wherein a type of indeterminate franchise is extended to the railway seeking extensions for its service so that proper equitable readjustment is assured the operating company when the main franchises expire, has attracted nationwide attention and may prove to be a partial solution to the problem.

Water Transportation Situation is Acute

With respect to water transportation the crisis is acute. The Shipping Board late last year had tied up no less than 956 steel hulls and had in actual operation only 420 vessels out of a total of 1,464. This was illustrative of the more general situation. It is not too much to say that ocean freight rates out of San Francisco are thoroughly demoralized. Recent cuts in intercoastal business have in some instances amounted to more than 50 per cent, and in the case of certain shipments all pretense of a published rate has been abandoned. This disorganization of the water service is important not alone for itself but because it again raises the question of the proper adjustment between the coast and the intermediate towns. The old water rates compelled a differential which the coast cities once enjoyed and which disappeared during the war. It now seems likely to come back for the same reason which compelled its adoption many years ago. It is not believed that the Interstate Commerce Commission is ready to deny to railroads permission to meet actual competition nor to compel corresponding reductions in rates to the interior, although it may insist on seeing a maximum differential. If it does anything of this sort, the railroads are not unlikely to be compelled to play the Mississippi Valley against the Atlantic Seaboard as a source of supply for western products, thus developing the short haul business which they control as against the transcontinental traffic which is exposed to water transportation. It seems that this whole situation in its effect upon our western markets is a direct outcome of the peculiar ocean rate situation and that it is of great importance to the whole western country.

The Tariff Problem

The tariff situation is grave insofar as the West is concerned. We are not so much concerned with the need of protective tariff as we are in a trading tariff that will enable us to develop foreign markets. A large percentage of canned fruits, for instance, which were produced in California were exported even prior to the war, and this business was largely stimulated during the war period, leading to a considerable development and increase in the output. It should be borne in mind, too, that as high as 50 per cent of the prune crop of California was exported even before the war, and even up to 85 per cent of the dried apricot crop in some seasons. It is obvious that the growers of apricots, peaches, pears, apples

and prunes, are very deeply concerned with the need of the development of foreign markets. It is their contention that tariff laws should be made not merely to safeguard industries which may require protection, but also to further the development of foreign markets for those other industries rapidly increasing in number which require foreign markets.

The Pan-Pacific Problem

With regard to our Pan-Pacific neighbors, owing to the general raising of tariff walls in our own country as well as Australia and New Zealand, the possibility of an interchange of products with these countries is very much reduced. This is accentuated by the mandate granted to Australia, New Zealand and Japan in the Pacific by which they have extended their domestic tariff to New Guinea, Samoa and also the islands north of the equator, which were allotted to Japan. As a consequence of the Versailles Treaty the United States has been literally deprived of a large trading area in the Pacific under the provisions of Mandate "C" which permits the extension of a domestic tariff.

The Ship Subsidy

There is still another question which should be given due consideration and that is to weigh carefully our intention to subsidize freight carriers, thus deliberately cutting off an opportunity of taking services in exchange for our goods. The exchange of goods for goods has been checked by the tariff mentioned above. The exchange of goods for services is in process of being checked by freight subsidies and payment in gold is impossible. Unless these barriers can be remedied the progress of the West in development of her foreign trade will be slow. The uncertainty concerning the Federal government's policies with respect to the tariff, taxation, and particularly the soldier's bonus, makes the whole marketing question acute in the West and is hampering the development of sound stable business policies. It is a rull in too many cases that if an American industry feels to any extent whatsoever the effects of foreign competition, a protective tariff to cut out that competition is asked for and usually obtained. There could be little or no objection to this in the case of industries struggling for life. The truth is that the established giant industries are nearly always the ones that get not only protection but license. Effort should be exerted to see that this situation does not prevail in the development of western industry.

High Taxes Must Be Eliminated

High taxes are obviously another source of great concern. We are groaning under the burden of taxation. In the lumber industry, for instance, one of the heavy burdens is its contribution in the form of taxes of various sorts, to the enormous public expenditures which are being made at this time. The principal solution here seems to be greater economy in government expenditures and the elimination of tax exempt securities so as to prevent an undue proportion of funds seeking investment in the tax exempt field. It has been estimated that approximately thirty billions are now outstanding in bonds that are

wholly or practically tax-exempt, the revenue from which should approximate one and one-quarter billion dollars per annum. In the petroleum industry there has been a tremendous increase in taxation in the counties where oil is produced. Federal taxes have also proved and will continue to prove burdensome, as is the case in many other industries. In the petroleum industry the pipe line taxes alone, which are now being adjusted, will cost the oil companies of California several millions of dollars. Pipe line taxes ceased December 30, 1921, the only economy in the cost of government that we may look forward to in this particular industry, as the capital taxes and income taxes set by the national government will probably exist throughout the present generation.

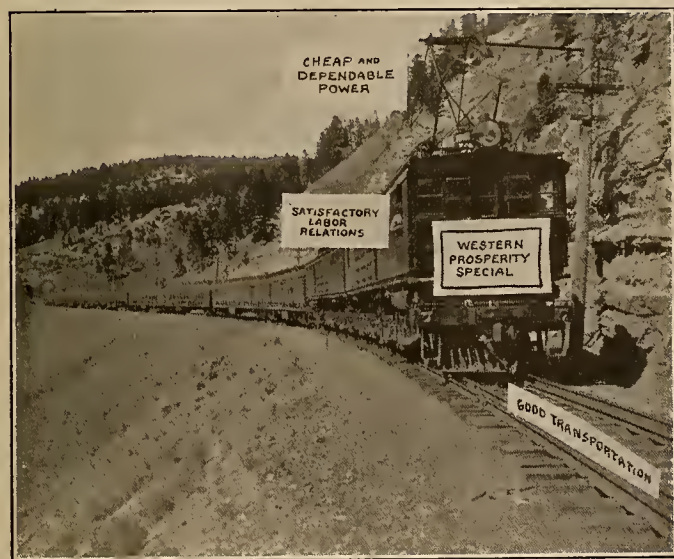
Our system of indirect taxation, particularly in California, where state taxes are largely raised from the gross returns of public utilities, results in a semi-political inflation of prime costs. This applies not only to manufacturing but also to irrigation and other operations involving prime production of raw materials. The absurdity here involved is that if Los Angeles gets a boulevard from the state it affects the cost of our kilowatt-hour service to industry.

Clearer Understanding of Business Needed

Too often the public, so-called, is so blindly self centered in its own selfish aims as to regard industry generally with exceedingly narrow vision. Business cannot be conducted without credit; and credit must be based on a reasonably clear understanding of the facts and on a faith that the other fellow will act with reasonable fairness. Public relations cannot be satisfactory without this same confidence. Let us take as an example an industry other than one of the public utilities—the lumber industry. The lumber industry in common with most other industries, no doubt, is usually not understood by the public in general and by the representatives of the public in various governmental, legislative and executive positions.

This misunderstanding is partly because the public for many years has been sitting in the grand stand watching a bewildering performance in which trust busters, demagogues, labor agitators, the Hearst press and others have been at great pains to show that corporations are instruments of the devil, to be hated, hampered and if possible destroyed so that the people may be saved; industries and divisions of industries have assisted in the play by throwing mud at each other (witness during the recent period of high prices each group blaming the other for profiteering instead of sensibly trying to show the public the fundamental economic causes of the high prices).. There has been relatively little effort on the part of industry to lay the facts before the public and to show how essential it is in the life of the country. The public has the mistaken impression that the lumber industry has made and is making enormous profits through the willful devastation of the forest resources of the country. There is an organized movement under way to force the industry, by direct Federal action, to manage its forest lands

in a way that will make them permanently productive. Some of those who are publicly discussing this question wish to have the lumber industry (along with the coal and oil industries) put in the class of public utilities regulated by the Federal government. While there is a great need for the development of a sound forest policy for the United States, satisfactory forest management cannot justly or effectively be brought about by a Federal legislative prescription which places all the responsibility and burden on the industry. The public is largely responsible for the situation which exists. A wise and equitable solution cannot be expected until the fog which now pervades the public mind is cleared up. When this is done the public will see that it has a number of duties—when the public is ready to assume those duties it will doubtless find most private timber owners ready to do what can reasonably be expected of them. The timber of the United States is being cut several times faster than it is being replaced by growth; the situation is growing more acute, and it will become more so in the future. Something will be done sooner or later to provide for a national forest policy. There is urgent need for sound public education; if the public does not become thoroughly informed it is apt, when it does move, to take decid-



Running along the tracks of good transportation, with satisfactory labor relations for a crew, and cheap and dependable power to operate the engine, the "Western Prosperity Special" signals "full speed ahead"!

edly unsound and unfair action. A number of lumber manufacturers, pulp and paper manufacturers and other private timber land owners are cooperating with the United States Forest Service, State Foresters and others in an effort to work out a sound policy but much still remains to be done.

Disastrous Legislation Should Be Headed Off

"Too much government in business and not enough business in government" was an effective campaign slogan, but little has been done to remedy matters. The tendency of the times is for salaried groups of self-perpetuating officials to fasten on to existing and to create additional branches of governmental activities and to use every possible avenue of publicity at governmental expense for broadening

and increasing the importance of their position. This not only increases the cost of government and causes a great deal of wasteful overlapping and conflict, but during the war set such an example that private institutions and private industry have ever since been suffering from the self-advertising political propagandist. We have established pretty nearly all the comforts and luxuries the government can furnish, but under the present methods of marketing, the people are having difficulty in meeting the costs involved. It is difficult to say how a sentiment can be created to stop any further expansion of government costs until actual disaster has compelled the people to see the wisdom of leaving a little of the tax money in the pockets of the people themselves. As a consequence of all this we find California today faced with one of the most atrocious pieces of legislation ever devised, namely, a proposed constitutional amendment to bond the state for \$500,000,000 and put this money at the disposal of a super-board of governors with no one to check or control their actions. With 70% of the nation's undeveloped water power at our doors and with keen initiative attracting industries of the world to our business centers and with the same adequate, continuous and economic power service that has prevailed in the past the West should go ahead in development beyond our fondest dreams. This development, however, will only come by each individual seeing in this vision of attainment a reward for his efforts, and by industrial accomplishments not subject to the control of a political machine, but subject rather to sound review and regulation by a body of men authorized under the law to see that justice and fairness prevail in utility evolution without government itself entering into competition with private business.

California today has more bonds outstanding than any state except New York and Massachusetts. With \$500,000,000 added to California's present debt of \$75,000,000, California would have about 45% of the aggregate debt of all the states of the union. Bonds mean increased taxes, no matter what theorists supporting the Water and Power Act may assert to the contrary.

The Answer—Understanding and Cooperation

There is a crying need for a systematic and harmonious development of our water not only for power but for irrigation and flood prevention as well. Under the stimulus of world war, men found that they could get together and solve intricate difficulties overnight. There is no reason why similar wonders could not be accomplished without the entanglements and delays and uncertainties involved in burdensome legislation.

The final answer to all these problems is that there must be a fuller and deeper understanding of their meaning and how they affect each individual citizen. This understanding, born of a sympathetic attitude toward one's fellows, will make possible an adjustment of economic problems of such intrinsic value to the West as to place it foremost among the territories of the world.



WHERE THE PURCHASING POWER OF THE WEST IS VESTED

The purchasing power of any section is the reflection of its activities. The Western development as a whole, is progressing at an even faster rate than the growth of population, which itself was higher than that of any other section of the United States. By 1930 there should be at least 12,000,000 people in the eleven Western States.

A Fifteen Billion Dollar Market for Equipment and Supplies

A Detailed Analysis of Western Expenditures Shows that Some Fifteen Billion Dollars Will be Spent by Thirty of the Major Industries of the Eleven Western States Within the Next Ten Years



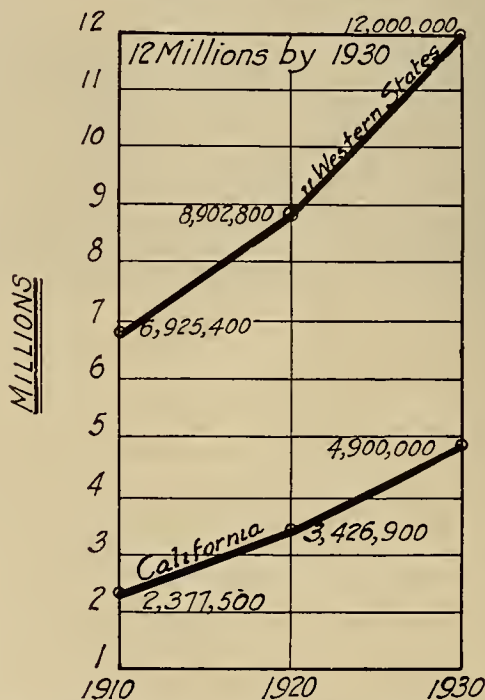
To determine approximately how much money would be spent in capital investments in the markets of the West within the next ten years, the Journal of Electricity and Western Industry, in cooperation with the Pacific Coast Electrical Association, has made a comprehensive survey of present conditions in the major industries of this field. This has involved extensive correspondence and personal interviews with experts in the various lines, as well as a field study of factories and mills. The

figures have been checked so far as possible by those from government sources—and it is believed that the estimates in each case are based upon sound figures—and are conservative rather than over-optimistic in their predictions. It is realized

that no prophecy can be looked upon as accurate—and all that has been attempted in this compilation of figures is to offer an intelligent estimate of the future possibilities of the West as a market for various materials.

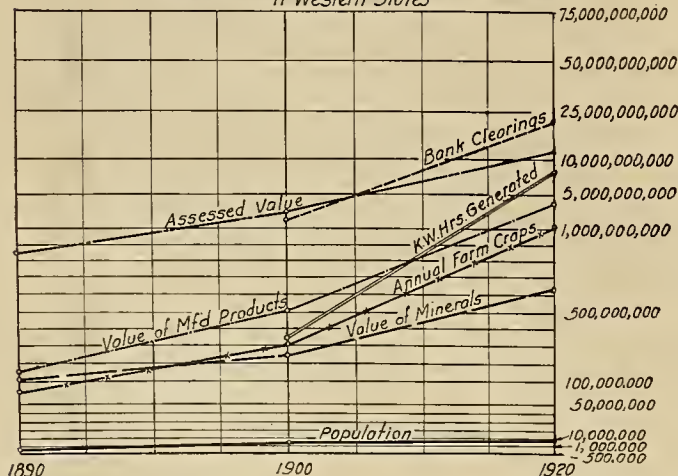
After all, the purchasing power of any market bears a fairly definite relationship to population as it is related to the development of the resources of the district in question.

GROWTH OF POPULATION OF 11 WESTERN STATES.



Population, as calculated upon the percentage increase of the respective western states for the past decade will have reached nearly 5,000,000 people for California and 12,000,000 for the West by 1930. By 1932, the figure will be nearer 13,000,000.

FACTORS IN THE GROWTH OF THE WEST 11 Western States



The various elements of western activity reflect the basic growth of the region. It is interesting to note how the increasing use of electricity is related to progress along other lines, industry and electricity being inter-dependent factors.

The money which the West will spend in the next ten years will be spent in developing its water power, in irrigating its fields, in building factories and homes and in extending its

transportation systems. In estimating future population, the factors of increase shown by the individual states during the past decade have been applied to the next ten years, with the result that it appears that there will be a population of approximately 12,000,000 in the eleven western states by 1930. Bank clearings, assessed valuation of property, value of farm crops and like phases of western growth have been similarly plotted. In all cases where money values are involved the factor of inflation which artificially increased

Assuming that the purchasing power of the dollar will increase in the same ratio during the next decade as it has decreased during the past ten years, the 1915 figure has been used. This has probably resulted in an underestimate in all departments, but has been thought preferable to an over statement.

Total expenditures by states are as follows:

STATE AND CITY GOVERNMENT WILL SPEND \$1,800,000,000

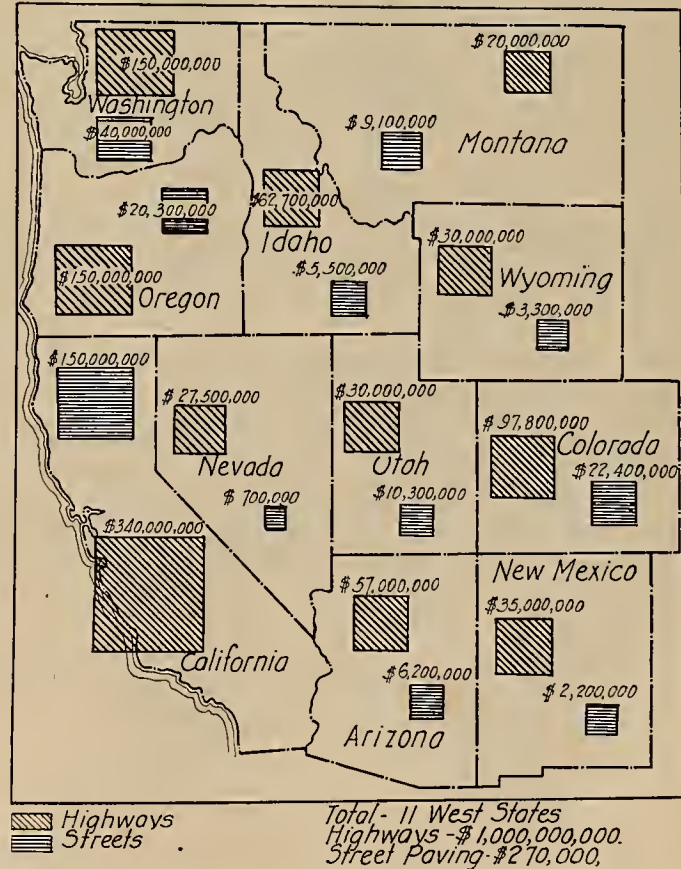
	City Expenditures (Exclusive of street paving)		State Expenditures (Exclusive of highways)	
	Capital Outlay	Running Expenses	Capital Outlay	Running Expenses
Arizona	4,137,667	21,522,777	4,717,428	23,441,250
California	95,272,300	490,314,600	59,728,358	232,226,875
Colorado	15,164,050	78,123,100	11,991,730	59,337,500
Idaho	3,741,210	18,501,420	11,904,810	56,987,500
Montana	6,041,050	31,132,380	7,544,104	37,329,750
Nevada	441,485	2,274,470	842,980	4,271,250
New Mexico	1,394,970	7,207,960	4,476,161	22,148,750
Oregon	13,680,800	70,481,700	9,959,066	49,279,500
Utah	6,906,510	35,610,420	5,765,341	28,523,125
Washington	27,039,520	132,349,040	17,382,072	86,110,000
Wyoming	1,957,890	10,086,780	2,596,625	12,848,635
11 western states	175,777,452	897,604,647	136,908,675	612,604,135

These figures mean that in the normal course of events \$85,000,000 will be spent in schools, \$33,000,000 in institutions, \$26,500,000 in public parks and playgrounds, \$59,000,000 in sewer systems, hospitals and general health and sanitation measures, and \$43,000,000 in public service enterprises handled by the eleven western states within the next ten years, not to mention highways, police and fire protection and the expenses of general government. These sums represent capital investment, running expenses, including labor and materials, averaging something like five times these amounts.

One Billion Dollars for Highways

Highway expenditures have been estimated upon the basis of present available funds and past expenditures. Fig-

ESTIMATED HIGHWAY EXPENDITURES - NEXT 10 YEARS



City and county expenditures exclusive of highways and city streets show a total of \$1,730,000,000 for the West. This calculation is far below probabilities, being based upon 1915 estimates, and taking no account of the alarming tendency toward increased government expense. Were present increases to continue in the same ratio the sum would be nearer \$5,000,000,000, or three times the estimates here given. We have made the perhaps improbable assumption that expenses will decrease in the next ten years in a similar ratio to what they have increased during the past decade.

values during the past decade has been taken into account and actual increases only used. Some of the figures of output thus calculated are here given:

PROBABLE OUTPUT, SIX MAJOR WESTERN INDUSTRIES

	1920	1930
Manufactures (value of products).....	\$3,450,000,000	\$16,400,000,000
Farm Crops	1,294,828,000	6,075,000,000
Mining	400,000,000	630,000,000
Lumber	70,000,000	90,000,000
Petroleum	243,000,000	300,000,000
Fish	9,300,000	1,200,000,000

This means that within a decade, products to the value of \$150,800,000,000 will have been produced by six of the leading industries of the West. Subtracting operating expenses, which will amount to some 95% of the total, and we get a figure of a billion and one-half dollars available from western sources for every per cent of profit on sales.

Government Expenditures in the Next Ten Years

One of the major channels of expenditure is in the cost of state and city government. In prophesying this figure, the per capita expenditure in capital outlay and in running expense for the various items of government expense in the western states has been applied to the growth of population.

ures for the next two years may be calculated with some accuracy, based upon outstanding state and county bond issues, as well as the money appropriated by Congress to supplement state funds. According to figures obtained from the state highway departments and government sources, probable costs for 1922 are as follows:

EXPENDITURES FOR STREET AND HIGHWAY PAVING—1922		
	State, Federal and County Roads	City Streets
Arizona	\$ 6,000,000	\$ 476,825
California	35,000,000	11,253,640
Colorado	9,780,000	2,110,440
Idaho	6,276,000	432,408
Montana	2,126,000	800,832
Nevada	2,750,000	61,920
New Mexico	4,000,000	180,084
Oregon	19,000,000	1,803,936
Utah	4,250,000	907,128
Washington	17,911,072	3,609,936
Wyoming	3,400,000	298,712
11 western states	\$110,493,072	\$ 21,935,861
Estimated 10-year period.....	\$1,000,000,000	\$270,000,000

With the passage of the federal aid bill last November, there is available more than \$62,000,000 in federal aid for the western states in 1922. Auto licenses in the western states for

the division of thirty millions spent during the past year, in which the following proportions held:

Grading	32.6%
Paving	47.4%
Shoulders .....	.3%
Structures	14.7%
Engineering	5.0%

This does not provide for a special segregation of labor costs, which may be considered, however, as amounting to more than half the total expenditure.

Transportation Investment in Ten Years

In connection with the highway figures it is perhaps pertinent to consider other departments of transportation. The railroads of the entire United States increased in investment of \$2,810,182,000 during the past five-year period. As this includes the year of the war, it is probably a conservative figure. Sixteen per cent of the mileage of the railroads is represented in the eleven western states which gives a figure of \$899,250,000 investment increase for a ten-year period in the West. Operating expenses during the same period would amount to \$58,000,000,000 for the United States, or \$9,280,000,000 for the West. Of this sum, \$1,750,000,000 will be spent in the maintenance of way, \$2,500,000,000 in maintenance of equipment and the remaining five billions in the costs of labor and supplies in the operating of trains and in overhead expense.

Street railways, in spite of a period of marked depression during the past decade, increased about \$250,000,000 in capital investment for the eleven western states. In order not to overstate the possibilities of the next ten years, the same figure is used, no allowance being made for the demands of an increased population. This means \$250,000,000 in investment and \$650,000,000 in operating expense.

On the basis of increase in telephones in the eleven western states for the period 1915-1920, it is estimated that \$250,000,000 will be spent in that field for capital expenditures and \$605,000,000 in operating expenses.

Money to be Spent on the Farms

The farms of the West produce annually crops amounting to some \$1,300,000,000, of which it is safe to say \$1,000,000,000 is promptly reinvested and consumed in improve-



An analysis of costs on a number of highway systems gives the above segregation of expenditures. Percentages of labor to materials vary with the different classifications.

1920 amounted to some \$14,000,000. With an average of 95 per cent of all auto license fees expended in road work and a probable increase of 160,000 machines per year, based upon the past decade, this makes \$237,500,000 available for roads from this source alone during the next ten years. With the probable appropriations from county, state and federal sources, averaging four times as much as that from automobile fees, the figure of \$1,000,000,000 allowed for highway expenditures in a ten-year period does not seem at all out of the way.

It is interesting to note, in this connection, that according to the Bureau of Public Roads, the United States spent \$600,000,000 in 1921 in highway construction and maintenance. This money was obtained from the following sources:

Local road bonds.....	33%
County and direct assessments.....	14%
State taxes	12.5%
State bonds	7%
Auto licenses	19%
Federal aid	14.5%

Figures as to the items of labor and materials into which highway expenditures regularly fall were based upon

Over a billion and a half dollars will be spent on the farms of the West in building improvements, implements and irrigation.

ments and running expenses of the farm. During the past ten years 38% of the improvements made may be credited to new capital, the remainder to improvements on farms already in existence. This means that we should add about \$650,000,000 in money from outside sources which will be available during the next decade.

Irrigation work, buildings and implements will come to something like \$1,600,000,000 in this time, which gives us a figure of somewhere around \$9,000,000,000 which may be counted roughly as the expenditure in operating costs on western farms during a ten-year period.

The value of farm buildings increased \$487,080,000 from 1910-1920. Counting on a probable increase of 100,000 farms in the western states in ten years (there were 104,900 more under cultivation in 1920 than in 1910) and allowing the same increase in value on farms already in existence as occurred from 1910-1920, we find that \$675,000,000 will represent the probable expenditure in farm buildings in the district west of the Rocky Mountains in the next ten years. This assumes that the value of the dollar will recover during this period so that its median value will be that of the period 1910-1920.

With the following percentages of farm homes equipped with utilities, there is much opportunity to develop along these lines in a more rapid degree than the expenditure for housing.

FARMS EQUIPPED WITH UTILITIES — U. S.

Farms with Telephones	Piped for Water	Equipped with Electricity
39.5%	33%	18.6%

There are 478,373 farms in the West. An estimate of present value of this equipment and its possible value, when all farms enjoy these facilities, gives for the West:

	Estimated Present Value	Possible Value at 100%
Telephones	\$30,600,000	\$75,675,000
Water	24,900,000	75,675,000
Electricity	21,100,000	113,510,000
	\$75,600,000	\$264,860,000

Adding 100,000 farms to those already in existence gives a possible total market on the farms of the 11 western states for \$65,000,000 in telephone equipment, \$70,500,000 in well, piping and fixtures and \$122,400,000 in electrical connections, wiring, fixtures and small lighting plants.

Farm implements and machinery have increased in value from 1890 to the present time, according to the following table:

VALUATIONS FOR IMPLEMENTS AND MACHINERY ON THE FARM — U. S. CENSUS

	1890	1900	1910	1920
Arizona	197,000	765,000	1,788,000	8,821,000
California	14,690,000	21,312,000	36,493,000	136,069,000
Colorado	2,729,000	4,747,000	12,792,000	29,000,000
Idaho	1,172,000	3,295,000	10,476,000	38,417,000
Montana	1,356,000	3,672,000	10,540,000	55,004,000
Nevada	537,000	889,000	1,576,000	3,631,000
New Mexico	291,000	1,152,000	4,122,000	9,745,000
Oregon	4,557,000	6,507,000	13,206,000	41,567,000
Utah	1,165,000	2,923,000	4,468,000	13,515,000
Washington	3,150,000	6,272,000	16,710,000	54,721,000
Wyoming	522,000	1,366,000	3,668,000	11,778,000
	30,366,000	52,900,000	115,839,000	402,267,000

*Estimated according to increase in farm buildings for same period. Estimated for 1930, total \$588,800,000.

Estimated Increase, 1920-1930—\$141,600,000 for autos, trucks and tractors, 45,000,000 for miscellaneous implements and machinery.

The great increase in the use of automobiles and tractors within the past ten years has accounted for the great increase in equipment during that period. There are at the present time, roughly, two automobiles for every three farms in the western states, one tractor for every ten farms and one truck for every twenty farms. This factor has been taken into consideration in estimating the probable expenditure of \$141,600,000 for automotive equipment and \$45,000,000 for miscellaneous equipment in the next decade.

The Importance of Pumped Irrigation

The following table gives an idea of the increase in money invested in irrigation projects since 1910:

IRRIGATION INVESTMENT BY STATES

	1910	1920	Underway	1930 Est.
Arizona	\$17,678,000	\$33,498,000	\$ 1,117,000	
California	72,580,000	194,886,000	31,000,000	
Colorado	56,636,000	88,302,000	6,896,000	
Idaho	40,978,000	91,501,000	7,500,000	
Montana	22,971,000	54,143,000	17,936,000	
Nevada	6,722,000	14,754,000	7,894,000	
New Mexico	9,154,000	18,210,000	2,230,000	
Oregon	12,700,000	28,929,000	12,656,000	
Utah	14,029,000	32,037,000	1,800,000	
Washington	16,219,000	29,299,000	8,385,000	
Wyoming	17,700,000	34,326,000	17,200,000	
	\$287,367,000	\$619,885,000		\$987,500,000
		Probable Increase, 1920-1930,		\$367,615,000

Acreages have been estimated as follows:

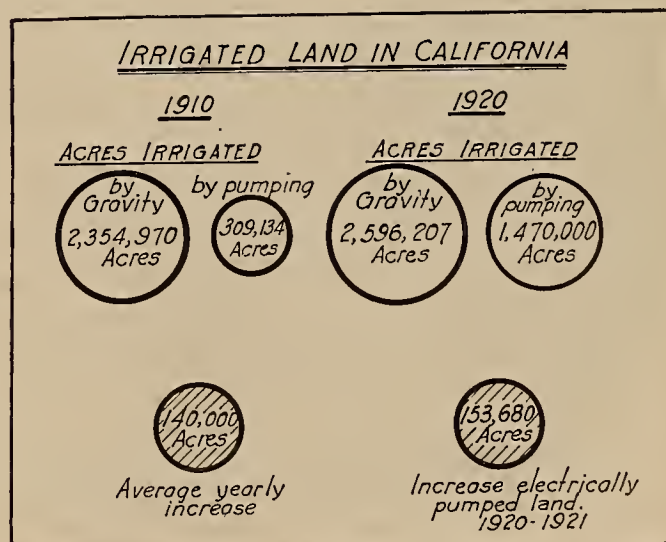
IRRIGATION GROWTH BY STATES — ACREAGE

	1890	1900	1910	1920	1930 Est.
Arizona	66,000	185,000	320,000	468,000	
California	1,004,000	1,446,000	2,664,000	4,219,000	
Colorado	891,000	1,611,000	2,792,000	3,348,000	
Idaho	217,000	609,000	1,431,000		
Montana	351,000	951,000	1,679,000	1,682,000	
Nevada	224,000	504,000	702,000	561,000	
New Mexico	92,000	204,000	462,000	538,000	
Oregon	178,000	388,000	686,000	986,000	
Utah	263,000	629,000	999,000	1,372,000	
Washington	49,000	135,000	334,000	530,000	
Wyoming	230,000	606,000	1,133,000	1,207,000	
	3,564,000	7,268,000	13,202,000	19,192,000	25,000,000
				Increase, 1920-1930,	5,908,000

This means a probable increase of 6,000,000 acres at an estimated cost of \$367,615,000. Prof. Frank Adams, specialist in irrigation with the College of Agriculture, University of California, estimates the five-year requirements of the more important existing projects and those contemplated in the near future in California as follows:

Needed to carry out immediate construction plans of organized irrigation districts, and in the main already authorized by vote of the landowners.....	\$12,000,000
To be needed during the next five years by organized irrigation districts to cover contemplated work now definitely included in construction program	23,000,000
Likely to be needed by new irrigation districts for which construction plans are now being prepared.....	44,000,000
Likely to be needed by new irrigation district projects now in process of organization or active promotion.....	78,000,000
Bond issues contemplated within the next five years by organized reclamation and drainage district in the San Joaquin and Sacramento deltas in which drainage is a feature.....	17,000,000
Total,	\$174,000,000

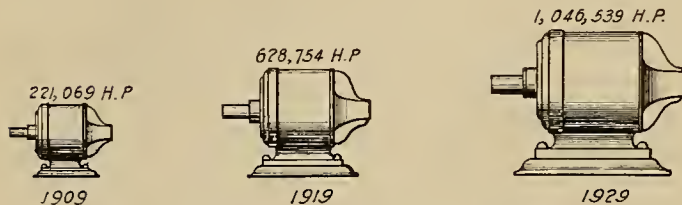
This would mean \$350,000,000 within the next ten years for California alone, which would make the investment for the West nearer \$500,000,000, particularly if such projects as the Columbia Basin and the Colorado actually go into effect.



Not only has practically all of the increase in irrigated area in California been pumped irrigation, but the increase in electrically pumped irrigation during the past year has been greater than the total average increase in irrigated acreage for that state.

Professor Adams states that large as these figures are, they do not include the plans of some few large irrigation projects such as those on the Feather River, nor do they include the needs or demands of the smaller type of development, of which there has been so much in the past. Furthermore, the figures do not include any of the money that will be necessary to enable settlers to build farm irrigation laterals and structures and to prepare their land for irrigation, which usually can be taken to equal in amount the construction cost of main works. With the added expenditure of \$2.50, which is given as a maintenance figure per acre irrigated over a ten-year period, amounting to \$55,500,000 within the decade, this would bring the figure somewhere in the neighborhood of \$1,000,000,000. In order not to drive the estimate too far, \$800,000,000 has been taken as a probable figure.

ESTIMATED INCREASE IN H.P. IN MOTORS *Western Mines*



The increase in the use of motors is typical of the increased demands of the mining field in every line. The only department which is lagging behind is that of prime movers, which is due to the fact that fewer mines are generating their own power—and more purchasing from the power company.

Among the California projects contemplated are the following:

California

- Dixon (Putah Creek). Gravity supply. Long talked of but nothing tangible in sight. 50,000 acres.
- Honey Lake-Tule and Baxter Creek districts. Gravity supply. 25,000 acres.
- Extension Imperial Valley. Depends on Boulder Canyon Project. 300,000 acres.
- Iron Canyon. Gravity supply. Apparently a long way off. 225,000 acres.
- Jess Valley. Gravity supply. 45,000 acres suitably located and adapted for irrigation from storage. Estimated total cost, \$1,108,000.
- Kings River. Area to be irrigated, 850,000 acres. 300,000 acre-feet to be pumped from underground. Remainder of total 2,000,000 acre-feet available from storage. Storage cost, \$6,965,000; underground development cost, \$1,815,000. Total cost of entire water development including power plant, \$9,530,000. Involves pumping to foothill and Mendota districts.
- Shasta Valley. Area 158,000 acres. Area greatly in excess of arable land in the valley. Feasibility of the project now under study by State Department of Irrigation and the Reclamation Service.
- Stony Gorge. Extension of Orland Project by additional storage to add 30,000 acres to project.
- Turlock-Modesto Irrigation Districts. Construction of Don Pedro Dam to supply late summer water for present districts now under way. Area of Turlock district, 178,790 acres.
- Kern River Irrigation District, proposed. Uniting present districts and adding 73,000 through storage and additional pumping. \$820,000 estimated cost of pumping plants required. Storage \$4,640,000.
- Madera Irrigation District. 350,000 acres. \$28,000,000 bonds voted. Gravity but involves pumping of 150,000 acre-feet from underground. Will develop from 15,000 to 50,000 horsepower.
- Merced Irrigation District. \$12,000,000 project of approximately 275,000 acres. Now under way.
- California Water Storage District. On west side of San Joaquin Valley. A large project taking over all of Miller and Lux west side canals, reclamation works of Districts 2051 and 2053 and numerous storage rights under contract, etc. No estimate made as to cost or extent of pumping.
- Possible Extension of and further development in Sacramento Valley by further storage on Sacramento River and construction of diverting dam across Sacramento River.
- Extension of Irrigation in Sacramento and San Joaquin Valley Reclamation Districts as in District 108. Some 70,000 acres involved.
- Several districts proposed in east Sacramento and Placer counties for further use of water from P. G. & E. system and from American River.
- Storage on American River tributaries for use near Placerville.
- Proposed Suisun Irrigation District, probably involves pumping. An alternate gravity supply under consideration. About 15,000 acres.

Possible Water Storage or irrigation district in Santa Clara Valley. Involves both gravity and pumping. Combination of present irrigation systems with extensions. 75,000 acres involved.

Possible Development on Feather River involving both gravity and pumping, Honcut-Yuba Irrigation District, 32,000 acres. An additional 30,000 acres near by is also under consideration.

The importance of pumping as a factor in irrigation development is continually increasing. Something like one-fourth of the present irrigated acreage in the West is pumped. In California where figures are available over an extended period, it is obvious that practically the entire increase in irrigated acreage is balanced by the increase in acreage served by pumps. The average rate at which land is brought under irrigation in California is stated as 140,000 acres. Figures reported by the power companies as compared with those of last year indicate that the increase in acreage served by electric pumps from 1920-1921 was 153,000 acres. This indicates not only the importance of pumping, but the pre-eminence of electric service on the farm.

Expenditures by Western Mines

Mining activities of the West involved the following investment over a ten-year period:

MINING — CAPITAL INVESTED

	1909	1919	1929 Est.
Arizona	176,818,000	432,635,000	698,452,000
California	284,838,000	460,279,000	635,720,000
Colorado	170,439,000	*157,410,000	*145,000,000
Idaho	80,999,000	* 80,067,000	* 79,300,000
Montana	165,777,000	214,887,000	263,997,000
Nevada	156,607,000	100,696,000	147,836,000
New Mexico	47,576,000	97,706,000	65,000,000
Oregon	20,527,000	* 5,873,000	* 1,680,000
Utah	97,983,000	187,042,000	277,101,000
Washington	21,306,000	25,862,000	30,418,000
Wyoming	12,664,000	104,430,000	196,196,000
	1,235,534,000	1,866,227,000	2,540,700,000

Probable Increase, 1920-1930, \$674,473,000

* Decrease on per cent basis.

Other figures of interest cover operating expenses of the mines. The bill for electric power purchased by mining interests in the eleven western states for 1919 amounted to \$11,097,000. This would mean \$125,000,000 in the next ten years. Supplies and material amounted to \$96,782,000 in 1919. A ten-year estimate is \$1,158,795,000. Labor over the same period, estimated from census figures, would amount to \$2,278,850,000. This gives \$3,560,000,000 for operating expenses.

Electrical figures are of particular interest. Except for California and Wyoming, where oil development has meant an increase in small engine units and in New Mexico among large mining developments, practically all western states show a decrease in the number of prime movers within the past ten years. This is due to a tendency to eliminate small engine units in favor of motors and purchased power. Over the same period there has been an increase of 10,662 motors amounting to 407,685 horsepower. If the increase in the next ten years amounts to no more, it would be an expenditure of \$4,000,000 for motors alone.

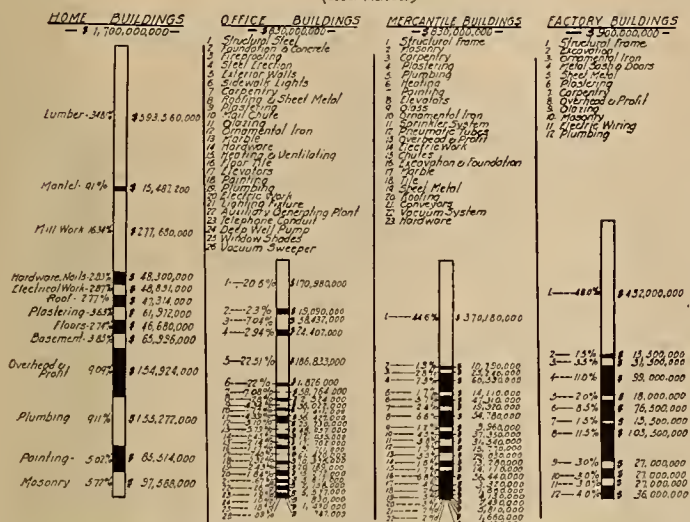
Over Four Billion for Construction

Building records for cities in the West in which the building permits amounted to over \$1,000,000 show that \$233,828,300 was spent in the construction of homes, commercial buildings and factories in thirty-four cities of this class. The population of these communities amounts to 2,863,337 people which gives an average expenditure of \$81.66 per individual for building construction. This figure was applied to the population of all cities of over 5,000 population in this district, which gave a figure of \$346,210,941 for 1921 in all cities of the eleven western states. Allowing for the normal population increase, this becomes \$4,200,000,000 to be spent in construction during a ten-year period. Applying the accepted ratio of homes, commercial buildings and factories, we get:

\$1,700,000,000.....for homes in the next ten years
 \$300,000,000.....for mercantile structures in the next ten years
 \$300,000,000.....for office buildings
 \$900,000,000.....for factories

To these sums, in estimating the total expenditures for building purposes should be added the \$675,000,000 for farm buildings which was included in the moneys probably to be

TEN YEAR CONSTRUCTION BUILDING PROGRAM (Labor Included)



Segregated costs on various types of buildings show where the money is going to be spent. Labor costs are included in the percentages here given. Probable expenditures for materials alone are listed in the table on the next page.

spent upon the farm. Segregation of costs are shown in the accompanying charts, which give an idea of the amount of paint, plumbing and structural steel which will be required.

MATERIALS USED IN ALL BUILDING CONSTRUCTION IN THE NEXT TEN YEARS

(Exclusive of labor, overhead and profit)

Foundation	\$ 55,260,000
Structural frame	720,980,000
Lumber, millwork	624,464,000
Concrete walls, fireproofing	177,105,000
Roofing	42,914,000
Bricks, mortar	94,390,000
Plaster, laths	155,702,000
Plumbing	159,999,000
Paint	93,586,000
Glass	56,660,000
Marble	48,057,000
Hardware, nails	79,025,000
Electric materials	104,831,000
Flooring, tiles, etc.	40,461,000
Ornamental iron	70,730,000
Sheet metal	14,800,000
Heating system	44,072,000
Elevators	100,780,000
Conveyors	5,000,000
Pneumatic tubes	13,000,000
Chutes	10,121,000
Vacuum cleaning system	1,600,000
Sprinkler	25,000,000
Sidewalk lights	2,526,000
Auxiliary power plants, etc.	2,988,000

Equipment and Furnishings

An attempt was made to get a definite estimate of the equipment which will be required to outfit these buildings. No statement could be obtained from furnishing houses or others supplying office and home equipment, but a field survey of factories and business houses has offered the basis for what is believed to be a reasonable guess in the matter of future requirements. It is accepted as a general average that the costs of furnishing the average home are in the neighborhood of 15 per cent of the cost of the building. From \$150-\$250 per room is a modest figure, which for an 8-room, \$10,000 house means \$1,200-2,000. It has been pointed out that many of those moving into new houses bring their furniture with them and add only a few pieces. The house which they vacate must in that case be furnished by the new tenant—or, if the same process is repeated here, at least, with the increase of so much lodging space to that already existing in the com-

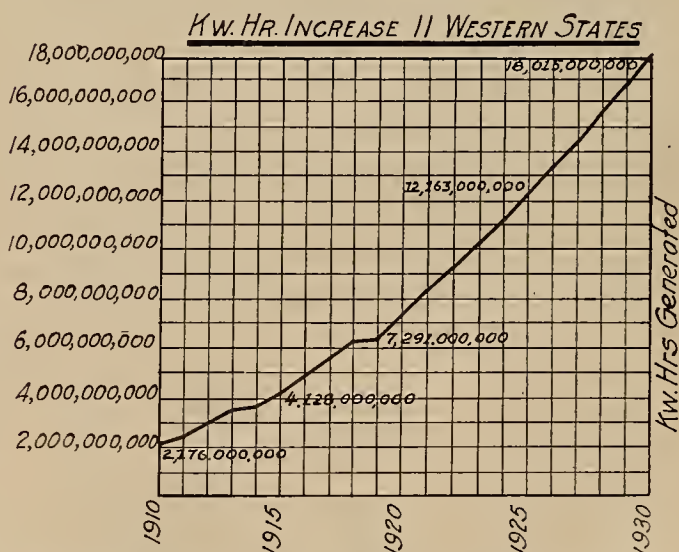
munity, an equivalent number of rooms must somewhere be furnished new. If it be considered that each new tenant down the line moves into larger quarters, so that the final newly furnished quarters prove to be a very modest working man's home, it must nevertheless be considered that each tenant will have had to purchase some additional equipment, so that in the end, the amount will be roughly the same. An attempt was made to estimate how many families may bring their furniture with them from the East, but the number appeared to be so small that the deduction from this source need not be considered. So long as the family moves from one part of the West to another, the above analysis holds roughly true.

In order to allow for all these factors, however, the figure of ten per cent of building costs was assumed as a furnishing expense. This gives \$170,000,000 for home furnishings. In the case of commercial buildings there is still less chance of equipment being brought from a great distance and ten per cent flat has been allowed as a very modest estimate of furnishing costs in office buildings and mercantile establishments. This gives \$166,000,000 for this field. An electrical wholesaler estimates that \$30,000,000 will be spent in electrical equipment in the West every year or \$300,000,000 in ten years.

The equipment needs of factories have been studied in considerable detail. Typical plants have been analyzed and their proportional figures applied to census returns in a typical field. The detailed analysis of twenty-nine western industries has been given in the table on page 494. From this it may be seen that the probable expenditure for machinery and factory equipment in the factories of the West in the next ten years will probably amount to some \$2,222,450,000 for the industries analyzed. On the basis of capital invested in the industries investigated, which is approximately 50 per cent of the total capital in all industries, this would mean roughly \$4,400,000,000 in equipment for all industrial plants in the West, or minus the billion dollars for power company investment which is included elsewhere, \$3,400,000,000.

One Billion for Power Company Construction

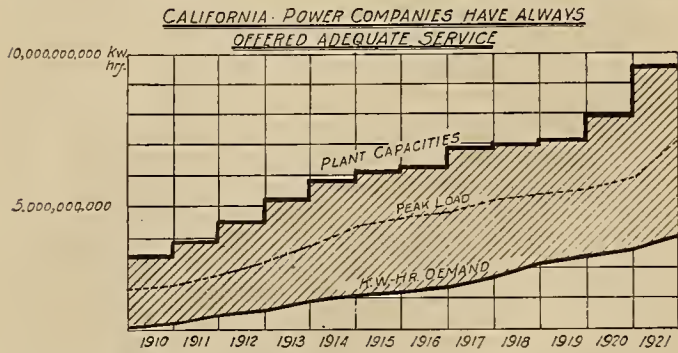
There are two primary factors in this development from a western standpoint—transportation and power supply. Without adequate facilities in either field, predicted growth would be materially checked. It is significant that both rail-



The demand for electric power has steadily increased during the past and estimates made by the power companies project this increase into the future. The curve here shown represents the combined estimates of 43 western power companies, based upon an industrial analysis of their respective communities.

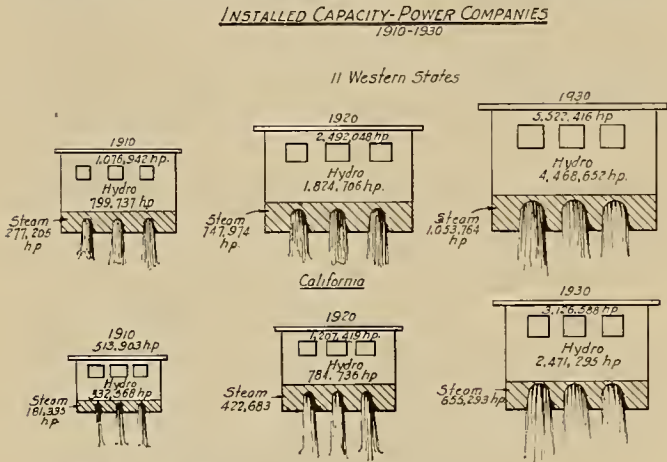
way freight shipments and power consumption may be taken as an accurate index of business conditions in this district.

Owing to the scarcity of coal in this district, and the increasing cost of fuel oil, combined with the abundance of water power, purchased electric power has taken over a much greater proportion of the operations of industry than is the



Western power companies have always kept ahead of the demand for power. This fact is illustrated by data from the major power companies of California. The upper curve shows the capacities of all plants of these companies—that is, their ability to meet a demand of this magnitude at all times. The lower curve shows the actual average demand for power, while the dotted line in the middle connects the peak points of each year—that is, the moment of highest actual demand. It is to maintain this safe margin of reserve power that the power program of the next ten years has been formulated.

case in other sections. So vital is electrical service in western development that it has often been styled the basic industry of the West and its securities have been sold upon the basis of self interest to those engaged in other phases of western



An increase of 3,030,368 hp. in all power plants is promised for the West, of which 2,643,956 hp. is represented by water power development and 386,422 by additional steam plants. Figures for California show an increase of 1,686,559 hp. in hydroelectric plants and 232,610 hp. in steam, or a total of 1,919,869 hp.

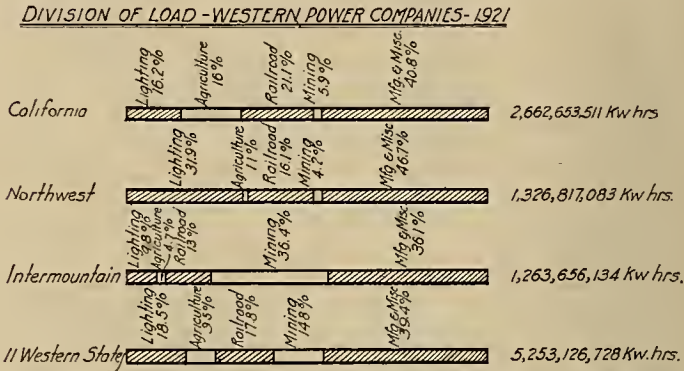
growth, whose prosperity is dependent in great measure upon the ability of the power companies to render adequate service.

A questionnaire sent to 43 of the leading power companies of the West, whose output comprises 95 per cent of the total electricity generated in this section, indicates the size of the industry. From the figures returned, it is obvious

THE ELECTRIC PUBLIC SERVICE INDUSTRY OF THE WEST—1921					
	California	Oregon-Washington	Inter-mountain	Total Reporting	Est. 11 Western States
No. consumers	843,011	339,578	270,819	1,453,408	1,584,214
Connected load, hp.....	2,959,413	1,152,954	1,431,224	5,543,591	6,042,514
Employees	20,300	5,915	3,740	29,855	32,541
Payroll	\$ 31,227,496	\$10,170,171	\$5,832,868	\$47,230,536	\$51,481,284
Taxes	\$ 6,049,577	\$ 2,590,467	\$2,341,392	\$10,981,437	\$11,969,763
Miles of wire.....	127,382	40,583	49,087	217,052	236,586
Fuel consumed:					
coal, tons		39,807	214,777	254,584	
oil, bbl.	2,840,395	144,132	7,530	2,992,047	
wood, units		162,832	1,000	170,832	
*Total investment	\$448,669,330	\$221,375,098	\$255,337,121	\$925,381,551	\$1,008,665,890
Total kw-hr. generated....	4,000,479,010	1,539,163,019	2,301,211,811	7,840,855,830	8,548,690,000
Power plant, capacity, hp.	1,463,009	725,363	729,257	2,917,629	3,177,298

*This figure includes electrical departments only—gas, water and street railways not considered.

that \$150,000,000 will be paid by these companies in taxes alone during the coming ten years, and nearly \$650,000,000 in payroll to employes engaged in the regular operation of the company and in construction work. The total money to be spent in enlarging the capacity of power plants and distribution systems is estimated by the companies at \$984,772,824 or approximately \$1,000,000,000, of which \$25,000,000 will be spent in steam equipment and \$310,000,000 in hydro plants. The total operating expenses over the same period is given as \$822,751,920 or in round numbers \$825,000,000.

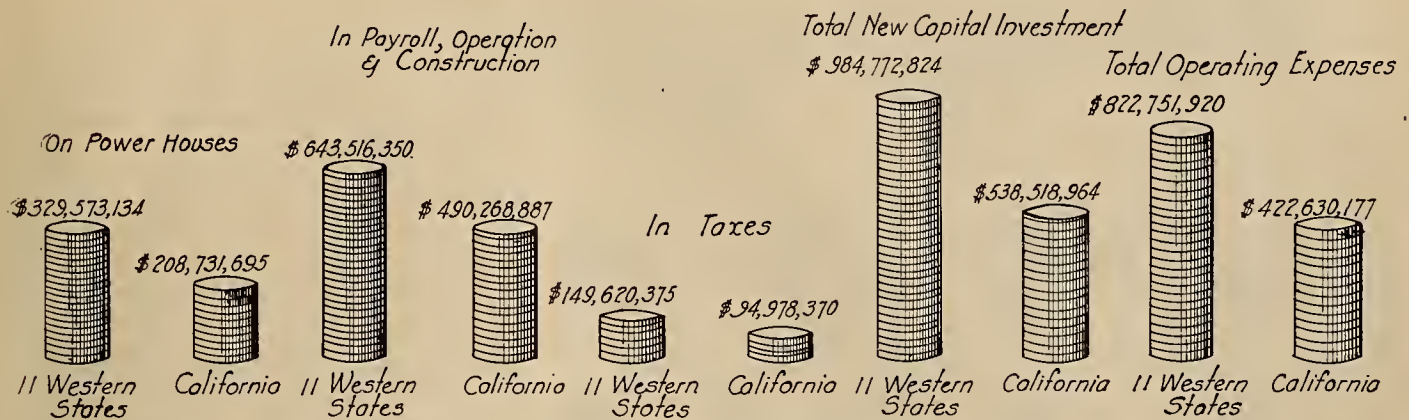


Division of load on the lines of western power companies; shows where the power went which was actually sold. This figure is somewhat smaller than that of kw-hr. generated, owing to losses in transmission and distribution.

The division of load as reported by these companies is significant of the industrial role played by electric power. It is interesting to note that the proportions have changed somewhat over those reported by the same companies for 1920. The manufacturing load in every case has taken a larger share of the power, street railways and agriculture slightly less. Mining shows a marked decrease, owing to the business depression; lighting, which includes the entire domestic load, a marked increase. Figures and proportions are as follows:

DISTRIBUTION OF LOAD, ALL WESTERN POWER COMPANIES—KW-HR. SOLD DURING 1921.				
	California	Oregon & Wash.	Inter-mountain	Total
Total power generated—1921, kw-hr.	4,000,479,010	1,539,163,019	2,301,211,811	7,840,853,830
Total sales—1921, kw-hr.	2,662,653,511	1,326,817,083	1,263,656,134	5,253,126,728
Lighting—kw-hr.	428,230,942	423,532,463	24,171,840	975,935,245
% of total.....	16.2%	31.9%	9.8%	18.5%
Agriculture—kw-hr.	426,819,652	15,126,659	60,358,221	502,304,532
% of total.....	16.%	1.1%	4.7%	9.5%
Railway—kw-hr.	562,881,126	213,888,030	164,464,154	941,133,310
% of total.....	21.1%	16.1%	3.0%	17.8%
Mining—kw-hr.	158,681,219	57,819,106	458,348,014	774,848,339
% of total.....	5.9%	4.2%	36.4%	14.8%
Manufacturing—kw-hr.	1,086,041,568	615,225,136	400,126,797	2,101,393,501
% of total.....	40.8%	46.7%	36.1%	39.4%
Total Industrial load—kw-hr.....	2,184,422,569	903,284,620	1,008,319,013	4,277,191,483
% of total.....	83.8%	68.1%	90.2%	81.5%

Over one billion dollars is invested in the power industry of the West, serving a million and a half consumers and employing 32,500 employes. Within the next ten years it is expected that these figures will be more than doubled. With the program now outlined, California power companies will have by 1930 an investment equal to that now given for the entire West, while the West itself will have reached the two billion mark.

MONEY TO BE SPENT BY POWER COMPANIES - - NEXT TEN YEARS - -

One billion dollars will be spent in power development within the next ten years and some \$825,000,000 in operating expenses by the western power companies. It is to be noted that the item of labor represents both that engaged in construction work and in regular operation of the system. The total investment figure includes, not only the expenditure for plants indicated but transmission and distribution systems, as well as miscellaneous increases in rights of way, buildings, etc.

In view of the construction program announced by the power companies over a year ago it is interesting to note how far it is already underway. A ten-year increase of 2,850,000 hp. was announced at that time. During the year 1921 nearly one-sixth of this program or 425,581 hp. was actually completed and added to the lines and 287,129 hp. in new plants is now under construction. Yearly increases in plant capacity from 1910-1930 are as follows:

PLANT CAPACITIES, POWER COMPANIES IN THE WEST, 1919-1930

	Western States hp.	California hp.
1910	1,076,915	513,903
1911	1,212,169	598,993
1912	1,354,742	695,734
1913	1,518,241	787,445
1914	1,687,879	889,561
1915	1,874,936	918,036
1916	1,967,544	959,457
1917	2,120,304	1,042,972
1918	2,221,351	1,056,111
1919	2,320,501	1,077,953
1920	2,492,048	1,207,419
1921	2,917,629	1,463,009
1922	3,204,858	1,684,534
1923	3,496,697	1,875,564
1924	3,845,639	2,035,962
1925	4,134,274	2,212,105
1926	4,346,726	2,352,175
1927	4,585,574	2,538,495
1928	5,043,687	2,776,312
1929	5,269,477	2,956,542
1930	5,552,416	3,126,588

This construction work will amount to an expenditure of \$540,000,000 for California and \$1,000,000,000 for the entire West. These estimates, particularly those for the Northwest and Intermountain district, are below what will actually be required. Many of the companies of these districts gave no estimates of future growth and, in order not to insert any element of fictitious values into the curve, the figures of their investment were entered without any increase for the

entire period. This, of course, is contrary to actual conditions, but it was thought better to leave the figure as it was rather than to hazard a guess which the power companies themselves were not willing to substantiate.

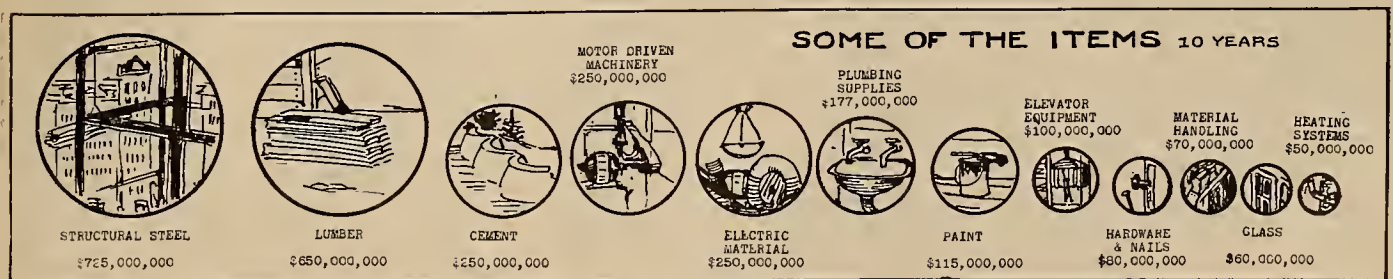
In estimating the amount of money which will be spent for individual classes of equipment in the carrying out of this program, figures for several large water power projects were analyzed and their weighted costs applied to the total increase in hp. capacity which is scheduled for western hydroelectric plants during the next ten years. The following estimates are thus obtained:

	California	11 Western States
Cement (power house only).....	\$ 2,755,000	\$ 4,709,024
Switching equipment	1,120,000	1,913,600
Transformers (power house).....	4,192,000	7,135,600
Structural steel	751,340	1,256,500
Generators and exciters.....	7,785,000	13,029,000
Turbines, valves, etc.	10,476,900	17,902,350
Lumber	5,938,375	10,147,175
Hoisting equipment	912,350	1,556,225
Steel pipe	5,275,500	9,015,000
Transformer and circuit breakers (substation)	10,315,000	17,625,700
Condensers	2,904,250	4,962,650
Miscellaneous equipment, substation.....	850,000	1,450,000
Miscellaneous equipment, power house.....	11,895,000	20,325,000

The figures here given cover about one-third of the total expenditures in hydroelectric equipment, as they do not include storage, transmission or many other factors which enter into the total. Equipment for steam plants which will amount to an additional \$25,000,000 during ten years, is not included in this figure.

Fifteen Billions in Ten Years for the West

Adding all these requirements for capital in these ten great fields of western endeavor, we get the following estimate:



Building costs, factory equipment, power company expenditures and highway figures have been combined to obtain the above estimates of individual items. These by no means represent the total figures, but are given as representing minimum figures at least.

FIFTEEN MARKETS FOR EQUIPMENT AND SUPPLIES IN THIRTY INDUSTRIES IN THE ELEVEN WESTERN STATES
A Table of Probable Expenditures for Various Materials Required in New Construction and Replacement During a One-Year Period in Selected Industries, Representing Fifty Per Cent of the Manufacturing Capital of the District West of the Rocky Mountains

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	Additions to Permanent Investment in 12 Months
Shipbuilding	Industrial Electrical Appliances	Industrial Wiring Supplies	Motor Driven Tools and Machinery	Mill Supplies, Belling, Packing, Valves	Material Handling Apparatus	Trucks (Electric and Gasoline)	Conveyors and Conveying Apparatus	Cranes, Hoists, and Loading Equipment	Industrial Lathing Apparatus	Industrial Plumbing and Sanitary Equipment	Lockers, Bins, Metal Shelving and Flooring	Paints, Preservatives, Industrial Greases, and Chemicals	Lubricants, Oils, etc.	Small Tools, Supplies, Grin Lys., Drills, Clamps, etc.	Raw Materials, Parts, Fiber, Steel, Rods, Fittings	
Irrigation	35,000	40,000	\$ 510,000	\$ 8,000	.....	\$ 16,000	.....	\$ 25,000	.....	.....	\$ 3,000	\$ 10,000	\$ 150,000	\$ 3,000,000	\$ 2,000,000	\$ 825,000
Foundries and Machine Shops	300,000	420,000	3,000,000	6,000	.....	24,000	.....	6,000	.....	12,000	1,000	5,000	47,000	4,000	2,000,000	30,000,000
Power Plants	15,800,000	13,000	225,000	.....	.....	500,000	.....	200,000	.....	80,000	12,000	12,000	900,000	5,000	74,000,000	1,200,000
Mining	36,000	30,000	1,200,000	60,000	\$100,000	500,000	\$ 100,000	200,000	.....	300,000	.....	31,000	2,400,000	63,000	48,000,000	100,000,000
Refrigeration	240,000	112,000	1,000,000	15,000	100,000	2,000,000	100,000	25,000	.....	1,000,000	3,000	21,000	63,000	.....	8,000	3,000,000
Paper Mills	85,000	280,000	1,320,000	3,000	.....	30,000	5,000	5,000	\$ 3,000	10,000	1,000	1,000	135,000	25,000	37,000,000	500,000
Flour Mills	100,000	28,000	1,650,000	9,000	12,000	36,000	45,000	.....	16,000	6,000	1,000	.....	234,000	1,000	75,200,000	2,600,000
Lumber Mills	286,000	84,000	30,000,000	20,000	80,000	80,000	100,000	20,000	.....	3,000	1,000	2,000,000	155,000	1,000	2,000,000	3,250,000
Cement Mills	60,000	28,000	180,000	1,000	10,000	22,000	110,000	6,000	.....	4,000	1,000	40,000	225,000	20,000	45,000,000	4,000,000
Textile Plants	10,000	2,000	180,000	1,000	.....	15,000	.....	2,000	.....	20,000	1,000	.....	165,000	4,000	3,000,000	1,120,000
Fertilizer Works	7,000	2,000	48,000	2,000	.....	9,000	.....	4,000	.....	2,000	1,000	1,000	1,000	1,000	2,000,000	75,000
Chemical Plants	6,000	2,000	45,000	2,000	8,000	50,000	15,000	6,000	.....	8,000	1,000	1,000	87,000	1,000	950,000	420,000
Stone, Clay and Vitrified	76,000	12,000	100,000	3,000	15,000	25,000	90,000	13,000	.....	8,000	1,000	1,000	2,000	1,000	110,000	1,200,000
Electric Smelters	145,000	15,000	600,000	4,000	12,000	47,000	300,000	69,000	37,000	.....	.....	10,000	300,000	2,000	180,000,000	4,685,000
Tire and Rubber Factories	18,000	15,000	125,000	1,000	4,000	8,000	.....	8,000	.....	8,000	1,000	2,000	32,000	1,000	4,700,000	840,000
Trucks and Tractors	3,000	1,000	100,000	1,000	.....	2,000	3,000	.....	17,000	2,000	1,000	.....	3,000	2,000	800,000	45,000
Oil Producers and Refiners	48,000	5,000	120,000	60,000	80,000	240,000	.....	.....	.....	80,000	8,000	.....	120,000	1,000	46,500,000	4,000,000
Electrical Transportation	2,000,000	100,000	1,000,000	1,000	.....	15,000	.....	15,000	.....	2,000	1,000	.....	.....	1,000	1,000,000	25,000
Agricultural Implements	3,000	1,000	30,000	2,000	.....	12,000	8,000	3,000	.....	2,000	1,000	2,000	67,000	1,000	1,100,000	240,000
Iron and Steel Plants	27,000	8,000	350,000	2,000	.....	30,000	.....	9,000	.....	2,000	2,000	6,000	78,000	2,000	3,210,000	300,000
Milk Products	40,000	5,000	40,000	4,000	19,000	54,000	57,000	.....	.....	20,000	1,000	2,000	78,000	1,000	40,900,000	950,000
Food Products	4,000	1,000	75,000	4,000	5,000	11,000	21,000	5,000	8,000	8,000	1,000	1,000	11,000	1,000	757,000,000	275,000
Furniture	21,000	9,000	75,000	3,000	4,000	12,000	3,000	.....	.....	6,000	1,000	4,000	27,000	1,000	5,000,000	220,000
Paint Manufacturing	2,000	2,000	18,000	3,000	4,000	6,000	10,000	9,000	.....	5,000	1,000	.....	11,000	1,000	2,200,000	180,000
Sugar Refining	64,000	4,000	180,000	4,000	17,000	34,000	66,000	5,000	25,000	17,000	2,000	1,000	257,000	4,000	107,000,000	850,000
Fish Canning	12,000	3,000	300,000	12,000	8,000	32,000	60,000	4,000	24,000	16,000	2,000	1,000	19,000	2,000	7,700,000	800,000
Fruit and Vegetable Canning	85,000	12,000	300,000	12,000	12,000	95,000	180,000	12,000	12,000	48,000	5,000	3,000	135,000	5,000	40,700,000	2,400,000
Totals	\$10,732,000	\$39,790,000	\$13,324,000	\$758,000	\$503,000	\$3,702,000	\$1,332,000	\$657,000	\$188,000	\$1,630,000	\$51,000	\$2,162,000	\$5,751,000	\$3,139,000	\$1,466,904,000	\$222,245,000

Items 1 to 12 are new construction only.
Items 13 to 15 are principally operation and production materials.
The above industries represent in round numbers a combined capital of \$2,300,000,000 for the West, and a combined capital of \$22,000,000,000 for the United States.
This is 50 per cent of all manufacturing capital reported in the 1919 census.

ITEMIZED EXPENDITURES FOR TEN YEARS

Estimates in the accompanying table are based upon an actual survey of the factory needs in the field, applied to the extent of the individual industries as revealed by the census reports and the estimates just completed by the Journal of Electricity and Western Industry. An effort has been made to keep these figures as conservative as possible and where doubt existed as to the present conditions in an industry, pre-war figures were taken as a basis. In the case of shipbuilding, for instance, which developed to such major proportions during the war and has since died down to a considerable extent, pre-war conditions were assumed as typical of the present situation. There is always a large amount of repair work and some actual shipbuilding underway. Before the country entered the war, the yearly purchase of materials incident to the operation of shipyards amounted to \$100,000,000 a year.

Figures on the building industry should be added to these totals. Electrical work, for instance, will amount to some \$110,000,000 under the building program as outlined, structural steel to \$970,000,000, lumber and carpentry work to \$964,000,000. Subtracting the labor element from these various estimates and adding these totals to similar items from the other fields covered by the survey, gives the totals represented in the accompanying chart. These do not by any means represent totals of all western markets for materials of this sort, being confined to the industries here enumerated, but the estimates are of interest as representing at least a minimum. Including power plants and public buildings, as well as other construction, it is thus estimated that \$750,000,000 in structural steel will be used within the next ten years. Lumber and mill products, exclusive of the labor which goes into their erection, will come to \$650,000,000. Cement, with a rough estimate for highways, power projects and city construction work, will come to \$250,000,000. Motor driven machinery in the factories of the West is estimated at \$250,000,000 for the decade and electrical material, including interior wiring, motors, fixtures and generators, but not including the wire going into the transmission lines of power and telegraph companies, is given the conservative figure of \$250,000,000. When it is considered how many lines of factory development, as well as such important fields as telephone development are omitted from this figure, it is apparent that \$350,000,000 is probably nearer the situation. It is felt, however, that a minimum figure based on facts is preferable to a mere estimate and in consequence the lower figures are used in each case. Other fields include \$177,000,000 for plumbing supplies, \$115,000,000 for paint, preservative and industrial chemicals, \$100,000,000 in elevator equipment, \$80,000,000 in hardware and nails, \$70,000,000 in material handling equipment, including trucks, conveyors, hoists and cranes, \$60,000,000 in glass and \$50,000,000 in heating systems for homes and business buildings.

Estimates of probable expenditures in twelve markets of the West show a figure somewhere in the neighborhood of \$15,000,000,000 for the next ten years. These figures do not take into consideration the operating expenses, which amount to several times this sum in amount and which cover the items of wages paid, money spent for living costs, and practically all expenditures for primary materials, small tools and like factors of production. The figures here given cover capital expenditures, new plant or permanent equipment, buildings, dams, track or highways.



TEN YEAR PROGRAM OF EXPENDITURES

	Capital	Operating Expense
State	\$ 137,000,000	\$ 612,600,000
City	175,780,000	900,000,000
Highways	1,000,000,000	
City streets	270,000,000	
Railroads	900,000,000	9,280,000,000
Street railways	250,000,000	650,000,000
Telephones	250,000,000	605,000,000
Farms		9,000,000,000
houses	675,000,000	
implements	200,000,000	
irrigation	800,000,000	
Mining	675,000,000	3,560,000,000
Building construction	4,200,000,000	
Home furnishing	170,000,000	
Office and store furnishing	166,000,000	
Factory equipment	3,400,000,000	90,000,000,000
Power company construction	1,000,000,000	825,000,000
	\$14,268,780,000	

This means that \$15,000,000,000 will be required for capital expenditures in these ten fields alone during the next ten years. Even with the output from the major industries of the West, as tabulated at the beginning of this article amounting to something like \$15,000,000,000 per year, it is obvious that most of this money will be required in operating expenses with only a small percentage of profit. The West cannot do all its own financing. It will be some time before the West can be independent and part of the value of this survey lies in the picture it gives of the great sums of money which must be attracted to this region, with the reminder that conditions must be made sufficiently attractive to bring them.

Power Projects Planned for the West

Hydroelectric Developments Underway Outlined and Work of Federal Power Commission for Past 8 Months Reviewed

The West's billion-dollar hydroelectric development program for the next ten years will include the installation of approximately 2,650,000 hp. That this estimate is in all probability conservative is indicated by the work which is underway at the present time and the applications which have recently been filed with the Federal Power Commission for licenses and permits.

The following table gives a list of the projects on which work has already been started or on which work is definitely scheduled to begin during 1922:

Company	Name of Plant	Ultimate Capacity hp.
Bridge River Power Co.	Bridge River Plant	
City of Seattle	Gorge Creek Plant	270,000
City of Seattle	Ruby Creek Plant	180,000
City of San Francisco	Moccasin Creek Plant	150,000
Idaho Power Co.	Shoshone Falls Plant	11,100
City of Tacoma	Lake Cushman Project	56,000
Utah Power and Light Co.	Olmsted Plant	
Northwestern Electric Co.	Underwood Plant	6,000
Portland Railway Light & Power Co.	Oak Grove Plant	
Pacific Gas and Electric Co.	Pit River No. 1	63,000
Pacific Gas and Electric Co.	Pit River No. 2	20,000
Turlock and Modesto Irrigation Dist.	Don Pedro Plant	70,000
San Joaquin Light and Power Corp'n	Balch Power House	108,500
Southern California Edison Company	Big Creek No. 3	150,000
Sespe Light and Power Co.	Santa Paula Project	28,500
Southern Sierras Power Co.	Forest Home	3,350
Southern Sierras Power Co.	Leevining Creek	13,400

During the eight months ending April 29, the Federal Power Commission granted licenses and permits for a total of 18 hydroelectric developments in the west, exclusive of Alaska. These involved a total of 651,820 hp. The filings acted upon by the commission follow:

Project No.	License or Permit	Company	Location	Installed Capacity hp.
234	P	Portland Ry. Lt. & Pr. Co.	Clackamas River, Ore.	34,000
155	L	So. Sierras Pwr. Co.	Snow Creek, Cal.	3,750
298	L	So. Cal. Edison Co.	Kaweah River, Cal.	9,500
90	P	F. G. Baum	Little Colo. River, Ariz.	15,000
143	P	Mushen & Cronmiller	Deep & Camas Creeks, Ore.	800
149	L	Wyoming Pwr. Co.	Big Horn River, Wyo.	1,300
185	L	So. Sierras Pwr. Co.	High Creek, Cal.	4,000
190	P	Uintah Pwr. & Lt. Co.	Uintah River, Utah	2,400
253	L	Henry Weber	Denny Creek, Col.	
154	P	Elmore Copper Co.	So. Fork Boise River, Ida.	6,000
163	P	J. F. Myser & E. E. Drach	Frying Pan River, Col.	100,000
159	P	City of Boise	Payette River, Idaho	30,000
184	L	Eldorado Power Co.	So. Fork Amer. River, Cal.	100,000
96	L	San Joaquin Lt. & Pwr. Corp.	San Joaquin River, Cal.	45,000
175	L	San Joaquin Lt. & Pwr. Corp.	Kings River, Cal.	266,000
261	P	J. H. Hughes	French Creek, Cal.	4,000
135	L	Portland Ry. Lt. & Pr. Co.	Clackamas River, Ore.	30,000

Applications for permits and licenses received by the commission from the western states during the same eight months' period totaled 4,925,340 hp.

Where and How Western Power Companies Will Spend



Spillway just above the penstock intake on the Hat Creek No. 2 development of the Pacific Gas and Electric Company in the Pit River region, where this company is developing about 125,000 kw.



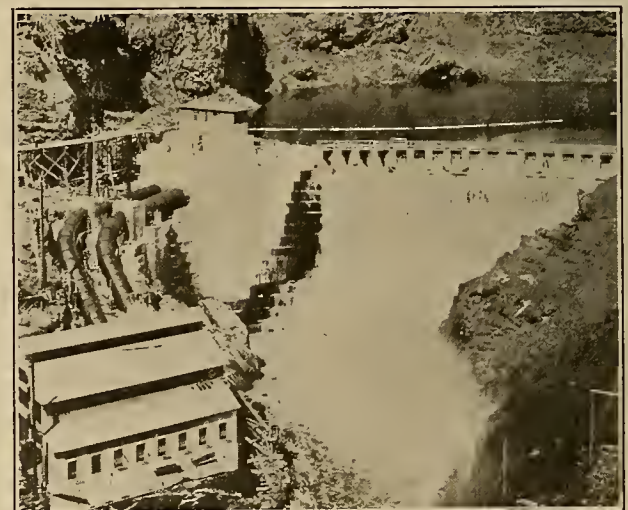
The core wall and outlet works of the Twin Lakes dam of the Western States Gas and Electric Company. This dam is part of this company's 100,000-hp. development on the American River.



False work of the diversion dam on the Fall River section of the Pit River No. 1 development of the Pacific Gas and Electric Company. The excavation in the background is for by-passing the water during construction.



Rim rocks on the upper Clackamas River presented unusual difficulties in the construction of a serviceable road to the 80,000-hp. Oak Grove project of the Portland Ry. Light and Power Company.



View of the Copco dam and power house of the California Oregon Power Company. Enlarging the storage capacity of the dam and development of additional energy are being carried forward.

One Hundred Million Dollars a Year in New Development



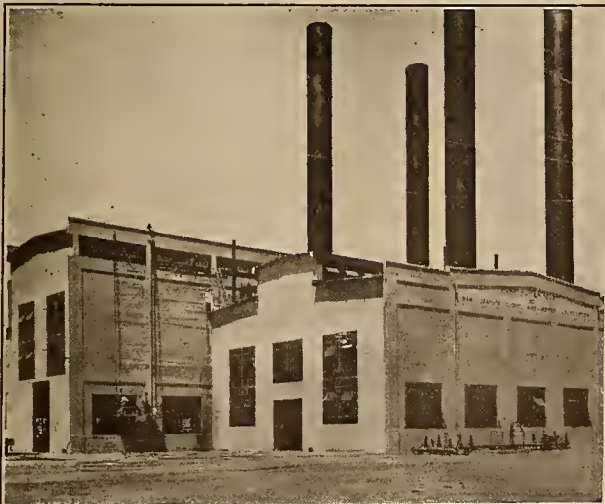
This view shows the operation involved in lowering concrete supports into a ditch of the Western States Gas and Electric Company's development on American River without interrupting the flow.



Section of Tunnel 3 of the Southern California Edison Company's Big Creek project where a record of 476 feet was driven during March, 1922, from one heading through the hardest kind of granite.



Shaver Lake in the Sierras, the storage capacity of which will be increased one hundred fold to feed the chain of power houses of the Southern California Edison Company on Big Creek and the San Joaquin River.



View of the exterior of the Midway Steam plant at Buttonwillow showing boiler house and power house. The San Joaquin Light and Power Company is engaged in erecting an additional unit near by.



Excavation along the road up the Clackamas River where supplies and equipment will be transported for the ten million dollar Oak Grove project of the Portland Railway Light and Power Company.

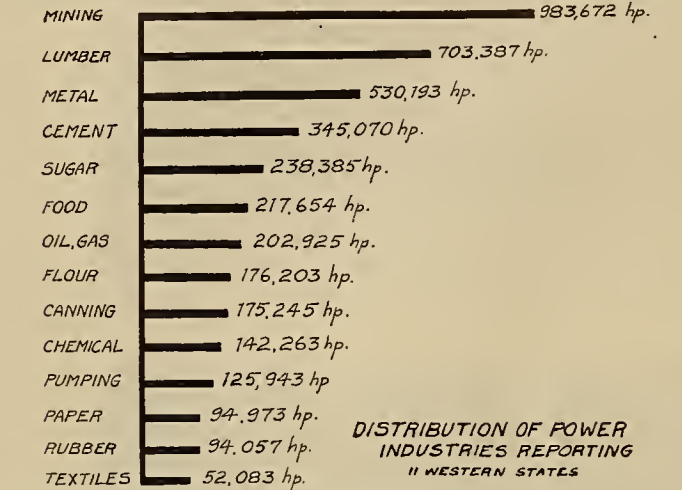
Power Needs of 6227 Major Industrial Plants of the West

A Personal Questionnaire Directed to Six Thousand Plants In the West Indicates That Over Eighty Per Cent of the Power Used is Electric and that Two-Thirds of All Power is Purchased from Power Company Lines

According to the U. S. census for 1920, the western states produced \$3,450,000,000 in manufactured products from 27,180 plants. In an endeavor to analyze the power needs of these industries, particularly in regard to the nature and location of those generating their own power, the Journal of Elec-

the report was made. Returns from the five largest cities are as follows:

	Portland	Seattle	Denver	San Francisco	Los Angeles
No. listed	360	332	233	871	570
No. reporting	165	83	104	325	181
Total hp. reporting.....	114,413	40,053	40,731	157,838	94,110
No. reporting Power Co's....	143	74	88	277	179
Hp.....	54,126	23,076	30,198	103,458	73,155
No. reporting isolated.....	21	12	17	69	3
Hp.....	19,962	6,203	6,693	35,677	8,275
No. reporting other power	64	26	11	44	21
Hp.....	34,266	10,674	2,740	18,693	12,680
No. reporting employees.....	92	82	55	226	148
No. employees reported.....	8,023	6,454	4,269	27,581	21,738



The total load reported by various industries shows mining in the lead with lumber a close second. If the horsepower reported by all food products is added together it shows a total of 846,429 hp., which would bring this field close to mining in the importance of its power demand.

tricity and Western Industry sent out a questionnaire to over 6,500 of the largest power plants in this district, asking for power uses, source of power and other pertinent information. After eliminating those reporting both from branch plants and main offices and other duplications, the list was finally reduced to 6,227, from which 2,782 replies were received. These have been analyzed and tabulated as given on the following pages. An idea of the comprehensiveness of the survey may be obtained from the fact that power companies report a total load on their lines of 3,299,943 hp., exclusive of railway and lighting loads. Returns from the survey give a total of 2,992, 840 hp. on power company lines, or 91 per cent of the total.

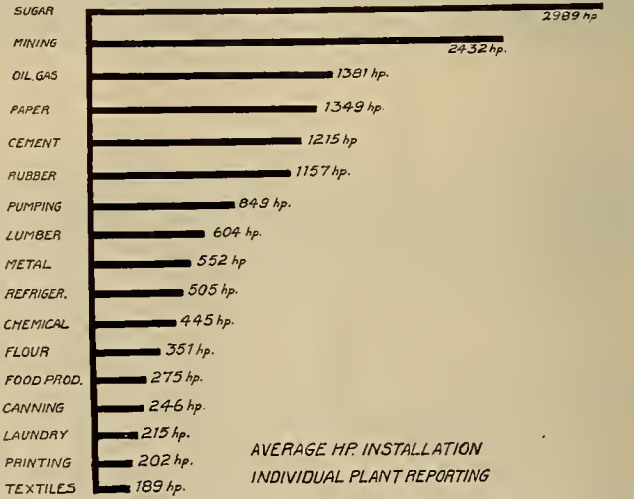
Distribution of Industries

There are several interesting aspects of the western manufacturing situation brought out in the returns. An idea of the distribution of major industries reporting by states is given on the accompanying map. It will be seen how mining predominates in the Intermountain states, lumber in the Northwest and how diversified is the industrial development in California.

Returns from the major industrial centers are of especial interest, although the situation is somewhat confused by the fact that returns were sometimes given by the main office on plants located elsewhere, figures on which could not be segregated and hence were included as of the locality from which

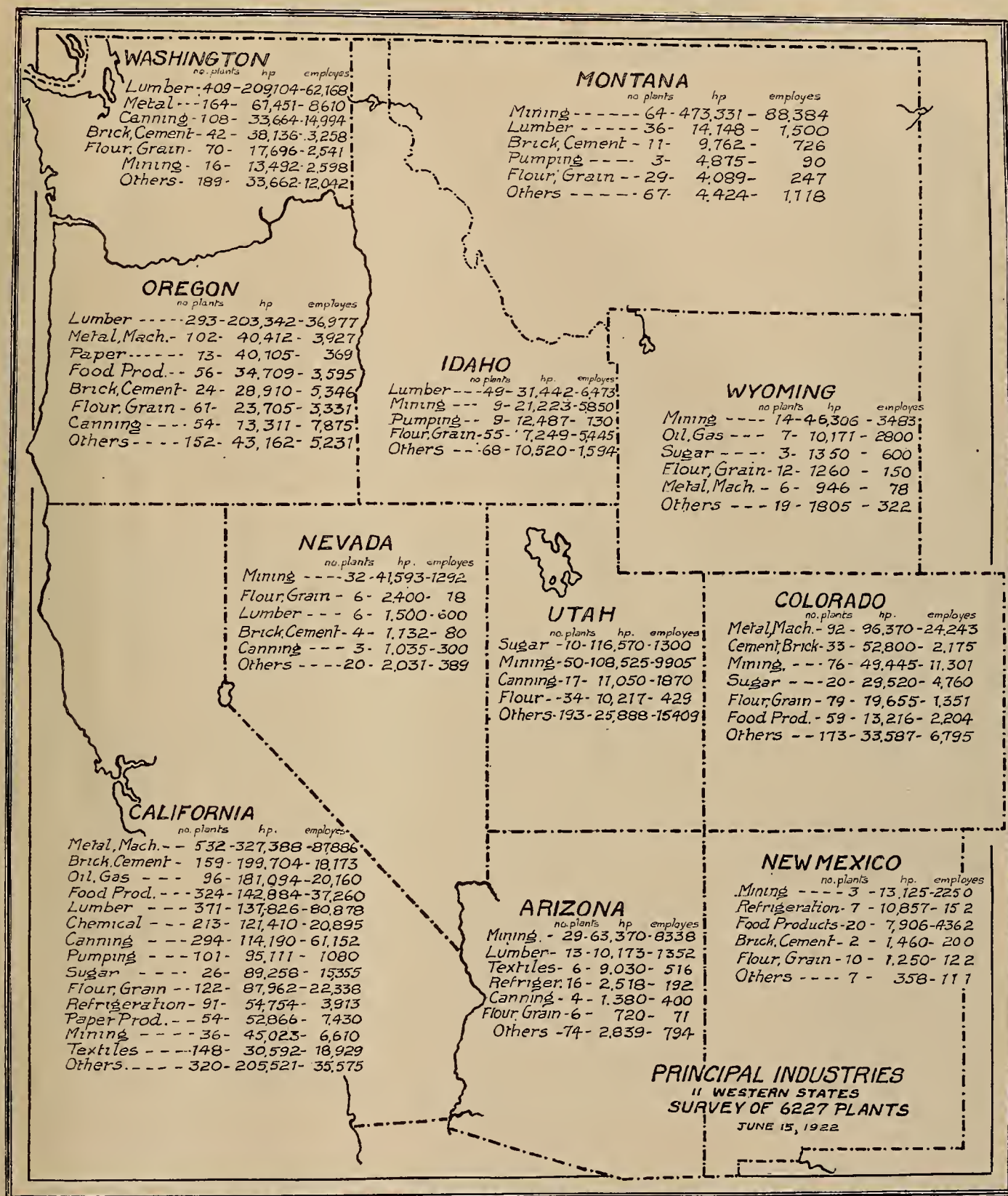
Details on these figures show that San Francisco has its largest development in food products and metal trades, with wood products a close third. Los Angeles has 24,706 hp. represented in metal trades, 10,000 hp. in flour and grain products, 11,800 hp. in rubber products and 7,000 hp. each in oil and gas and refrigerating plants. Portland, as was to be expected, shows the largest development in the field of lumber and wood products, with 49,773 hp. represented. Miscellaneous food products and cement report 15,000 hp. each and metal trades 13,500 hp. Seattle shows its greatest development in lumber mills and wood products, with metal trades next and canning and food products immediately following. Denver has a large number of metal industries, with cement plants, flour mills and chemical works following in the order named.

Taking the West as a whole, mining shows the greatest use of industrial power with 983,672 hp. All food products, with a demand of 846,429 hp. come



The largest individual plant reporting was a reduction works, with a steel mill a close second. Taking averages for the various fields, however, shows the sugar mill first, and mining second. The above schedule indicates the average sizes of the 2783 plants from which returns were received.

second and lumber, metal trades, cement and oil, gas and chemical plants follow down the line. A comparison of the relative sizes of individual plants shows the sugar mill ranking first with 2,989 hp. reported as an average. Mines and mills rank second with



Map of the eleven western states showing the distribution of industrial plants and the use of power

2,432 hp. Oil and gas, paper, cement, rubber, pumping (this represents city water works), lumber mills, metal trades, refrigerating plants, chemical works, flour, miscellaneous food plants, canning and packing establishments, laundries, printing establishments and textile mills follow in the order named. An idea of the size of the industrial plants whose names were included in the survey is to be gained from the ac-

companying chart which gives the average power use of plants of different types reporting.

Of the total of 4,332,348 hp. for all industrial plants included in the survey, 3,610,939 hp., or 83.3 per cent is the estimated total for electric power. Of this, 2,992,840 hp. is dependent upon power company service. This means that the public service companies provide 82.8 per cent of the electricity used, or

DISTRIBUTION AND POWER USAGE OF 6,227 WESTERN INDUSTRIAL PLANTS

***Isolated plant" as used below means industrial plant generating own electricity.
 †"Other power" means industrial plant generating power other than electricity.

	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
BRICK, CEMENT												
Number listed.....	4	159	33	8	11	4	2	24	17	42	2	306
Number reporting.....	1	58	25	3	4	2	.....	16	2	12	1	124
Total H. P. reported.....	30	74,316	40,015	577	3,550	567	.....	19,275	1,300	10,894	230	150,754
Number reported power company.....	.....	58	21	3	4	2	.....	12	2	12	1	115
H. P. reported power company.....	.....	72,854	11,011	577	3,440	567	.....	7,415	1,300	7,608	185	104,957
*Number reported isolated.....	.....	6	4	.....	.....	.....	.....	.....	.....	3	.....	13
H. P. reported isolated.....	.....	755	4,079	.....	.....	.....	.....	.....	.....	2,186	.....	7,020
†Number reported other power.....	1	3	9	.....	2	.....	.....	6	.....	3	1	25
H. P. reported other power.....	30	707	24,925	.....	110	.....	.....	11,860	.....	1,100	45	38,777
Number reporting employees.....	1	36	16	1	4	1	.....	8	2	14	1	84
Number employees reported.....	25	4,113	1,054	3	264	20	.....	1,782	220	1,086	15	8,582
Estimated total H. P.....	120	199,704	52,800	1,536	9,762	1,132	1,460	28,910	11,050	38,136	460	345,070
Estimated total employed.....	100	18,173	2,175	24	726	80	200	5,346	1,870	3,258	30	32,082
CANNING, PACKING												
Number listed.....	4	294	20	8	3	3	.....	54	19	108	.....	513
Number reporting.....	.....	133	8	2	.....	.....	.....	21	4	18	.....	186
Total H. P. reported.....	.....	31,079	2,984	225	.....	.....	.....	5,478	478	5,611	.....	45,855
Number reported power company.....	.....	127	4	2	.....	.....	.....	16	4	16	.....	169
H. P. reported power company.....	.....	21,580	668	150	.....	.....	.....	2,580	443	2,802	.....	28,223
Number reported isolated.....	.....	2	4	.....	.....	.....	.....	1	.....	4	.....	10
H. P. reported isolated.....	.....	400	1,766	.....	.....	.....	.....	10	.....	1,084	.....	3,260
Number reported other power.....	.....	27	2	1	.....	.....	.....	16	1	5	.....	52
H. P. reported other power.....	.....	9,099	550	75	.....	.....	.....	2,888	35	1,725	.....	14,372
Number reporting employees.....	.....	149	2	2	.....	.....	.....	6	4	12	.....	175
Number employees reported.....	.....	30,968	200	39	.....	.....	.....	875	78	1,666	.....	33,826
Estimated total H. P.....	1,380	114,190	7,460	900	1,035	1,035	.....	13,311	2,270	33,664	.....	175,245
Estimated total employed.....	400	61,152	2,000	156	300	300	.....	7,875	375	14,994	.....	87,552
CHEMICAL												
Number listed.....	.....	213	21	4	2	.....	.....	18	13	38	1	310
Number reporting.....	.....	58	7	.....	1	.....	.....	10	5	8	1	90
Total H. P. reported.....	.....	33,080	2,705	.....	120	.....	.....	1,620	2,167	459	20	40,171
Number reported power company.....	.....	48	7	.....	1	.....	.....	5	2	8	1	71
H. P. reported power company.....	.....	25,671	2,705	.....	.....	.....	.....	605	942	420	10	30,353
Number reported isolated.....	.....	5	.....	.....	.....	.....	.....	1	1	.....	.....	7
H. P. reported isolated.....	.....	1,710	.....	.....	.....	.....	.....	65	350	.....	.....	2,125
Number reported other power.....	.....	15	.....	.....	1	.....	.....	6	4	2	1	28
H. P. reported other power.....	.....	5,699	.....	.....	120	.....	.....	950	875	39	10	7,693
Number reporting employees.....	.....	37	2	.....	.....	.....	.....	5	6	10	1	59
Number employees reported.....	.....	3,631	20	.....	.....	.....	.....	158	363	236	3	4,411
Estimated total H. P.....	.....	121,410	8,106	1,760	240	.....	.....	2,916	5,634	2,177	20	142,263
Estimated total employed.....	.....	20,895	210	120	60	.....	.....	569	787	897	3	23,541
FLOUR AND GRAIN												
Number listed.....	6	122	79	55	29	6	10	61	34	70	12	484
Number reporting.....	4	53	49	28	8	1	8	35	15	32	6	239
Total H. P. reported.....	480	38,223	12,195	3,691	1,129	400	1,000	13,601	4,508	8,091	633	83,951
Number reported power company.....	2	44	35	26	7	1	3	30	13	31	3	195
H. P. reported power company.....	270	32,969	7,574	3,044	954	400	310	10,326	3,973	7,331	110	67,261
Number reported isolated.....	1	3	11	4	1	.....	.....	3	2	1	2	31
H. P. reported isolated.....	50	523	2,751	597	90	.....	.....	60	175	405	100	4,824
Number reported other power.....	3	15	11	1	2	.....	.....	3	13	5	6	64
H. P. reported other power.....	160	4,731	1,870	50	85	.....	.....	630	3,100	130	660	11,866
Number reporting employees.....	4	23	22	12	8	1	5	15	13	18	6	127
Number employees reported.....	47	4,213	403	118	68	3	61	819	166	654	78	6,630
Estimated total H. P.....	720	87,962	19,655	7,249	4,089	2,400	1,250	23,705	10,217	17,696	1,260	176,203
Estimated total employed.....	71	22,338	1,351	5,445	247	18	122	3,331	429	2,541	156	36,049
FOOD, MISCELLANEOUS												
Number listed.....	10	324	59	20	19	6	2	56	28	80	7	610
Number reporting.....	11	129	21	9	7	4	1	30	3	29	1	245
Total H. P. reported.....	79	37,486	4,704	635	753	330	35	18,594	609	5,002	60	68,287
Number reported power company.....	3	124	16	9	6	4	1	26	3	29	1	222
H. P. reported power company.....	77	31,212	2,148	515	543	295	35	15,088	409	3,168	20	53,510
Number reported isolated.....	.....	7	2	2	1	.....	.....	2	.....	2	.....	16
H. P. reported isolated.....	.....	2,000	614	60	35	.....	.....	135	.....	300	.....	3,144
Number reported other power.....	1	58	7	3	2	1	.....	16	2	13	1	104
H. P. reported other power.....	2	4,274	1,942	60	175	35	.....	3,371	200	1,534	40	11,633
Number reporting employees.....	3	111	16	6	5	4	.....	20	3	25	1	494
Number employees reported.....	17	12,762	869	119	84	60	.....	1,285	587	1,494	6	17,283
Estimated total H. P.....	71	142,884	13,216	1,400	2,033	495	70	34,709	5,684	16,672	420	217,654
Estimated total employed.....	57	37,260	2,204	396	319	80	40	3,595	5,480	4,781	42	54,254
LUMBER, WOOD PRODUCTS												
Number listed.....	13	371	45	49	36	6	20	293	31	409	2	1,275
Number reporting.....	6	113	12	10	6	1	8	222	9	189	2	578
Total H. P. reported.....	4,695	41,985	1,033	6,825	2,360	250	2,763	154,074	879	134,074	40	348,978
Number reported power company.....	2	90	9	5	1	1	1	103	8	97	1	316
H. P. reported power company.....	50	1,220	623	2,275	60	250	40	37,903	859	23,541	20	66,841
Number reported isolated.....	3	18	.....	1	2	.....	.....	4	29	1	.....	122
H. P. reported isolated.....	3,045	21,505	.....	3,500	425	.....	.....	483	38,942	20	64,393	132,313
Number reported other power.....	3	48	4	3	4	.....	.....	3	168	.....	78	312
H. P. reported other power.....	1,600	19,260	410	1,050	1,875	.....	2,240	77,229	.....	46,140	20	149,824
Number reporting employees.....	3	109	9	8	6	1	7	70	7	116	2	338
Number employees reported.....	312	23,760	218	1,057	553	100	1,877	8,834	347	17,640	202	54,900
Estimated total H. P.....	10,173	137,826	3,870	31,442	14,148	1,500	7,906	203,342	3,036	290,104	40	703,387
Estimated total employed.....	1,352	80,878	1,089	6,473	3,318	600	4,362	36,977	1,535	62,168	202	198,954
METAL, MACHINERY												
Number listed.....	8	532	92	11	16	2	1	102	29	164	6	963
Number reporting.....	1	224	38	1	3	2	.....	35	6	53	3	366
Total H. P. reported.....	40	127,387	39,807	40	11	251	.....	13,870	520	19,862	473	202,261
Number reported power company.....	.....	221	34	1	3	2	.....	33	6	53	3	356
H. P. reported power company.....	.....	117,648	16,617	40	11	251	.....	11,625	495	19,682	473	166,842
Number reported isolated.....	.....	7	3	.....	.....	.....	.....	1	1	.....	.....	12
H. P. reported isolated.....	.....	4,376	20,650	.....	.....	.....	.....	15	25	.....	.....	25,066
Number reported other power.....	1	15	5	.....	.....	.....	.....	4	.....	2	.....	27
H. P. reported other power.....	40	5,363	2,540	.....	.....	.....	.....	2,230	.....	180	.....	10,353
Number reporting employees.....	1	172	21	1	3	.....	.....	27	7	47	2	281
Number employees reported.....	10	28,478	5,533	15	12	.....	.....	1,039	344	2,469	26	37,926
Estimated total H. P.....	320	327,388	96,370	440	64	251	40	40,412	2,511	61,451	946	530,193
Estimated total employed.....	80	87,886	24,242	165	64	100	45	3,927	1,424	8,610	78	126,621
MINING, MILLING												
Number listed.....	29	36	76	9	64	32	3	17	50	16	14	346
Number reporting.....	23	36	73	9	64	32	2	17	43	15	13	323
Total H. P. reported.....	50,260	45,023	47,500	21,223	414,170	41,593	8,750	8,239	93,332	12,650	43,010	785,750
Number reported power company.....	19	34	53	9	61	31	1	14	42	13	13	291
H. P. reported power company.....	15,117	41,865	34,209	15,363	391,730	23,933	4,000	5,129	92,612	9,390	43,010	676,358
Number reported isolated.....	6	2	27	.....	4	3	1	2	.....	3	.....	48
H. P. reported isolated.....	23,543	2,268										

DISTRIBUTION AND POWER USAGE OF 6,227 WESTERN INDUSTRIAL PLANTS (Continued)

*"Isolated plant" as used below means industrial plant generating own electricity.
 †"Other power" means industrial plant generating power other than electricity.

	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
OIL AND GAS												
Number listed.....		96	7		4	1		7	3	5	7	130
Number reporting.....		26	5		1			4	1	1	1	39
Total H.P. reported.....		45,274	4,830		25			1,956	250	100	1,453	53,888
Number reported power company.....		25	4					2	1	1		35
H.P. reported power company.....		35,024	4,640					1,740	250	100		41,754
Number reported isolated.....		1									1	2
H.P. reported isolated.....		400									1,453	1,853
Number reported other power.....		8	2		1			1				12
H.P. reported other power.....		9,850	190		25			216				10,281
Number reporting employees.....		15	20		1			28	1		1	21
Number employees reported.....		3,150	20		6			4			400	3,608
Estimated total H.P.....		181,094	6,762		100	125		3,423	750	500	10,171	202,925
Estimated total employed.....		20,160	140		24	13		98	12	65	2,800	23,312
PAPER, PAPER PRODUCTS												
Number listed.....	1	54	4			1		13	1	14		88
Number reporting.....	1	20	1			1		10		5		38
Total H.P. reported.....		19,580	100			375		30,850		367		51,272
Number reported power company.....	1	15	1					10		5		32
H.P. reported power company.....		6,930	100					10,677		367		18,074
Number reported isolated.....		1				1						2
H.P. reported isolated.....		1,000				375						1,775
Number reported other power.....		5						6				11
H.P. reported other power.....		11,650						20,173				31,823
Number reporting employees.....		16						5		2		23
Number employees reported.....		2,203						142		100		2,445
Estimated total H.P.....	100	52,866	400			375		40,105	100	1,027		94,973
Estimated total employed.....	75	7,430	300			138		369	75	700		9,087
REFRIGERATION												
Number listed.....	16	91	15	9	6	5	7	14	4	17	1	185
Number reporting.....	7	39	8	2	1	1	3	6	2	8		77
Total H.P. reported.....	1,102	23,469	3,115	421	82	122	4,655	2,004	2,440	1,532		38,942
Number reported power company.....	3	39	4	2	1	1	1	5	1	8		65
H.P. reported power company.....	162	19,124	1,998	421	82	122	400	1,404	33	1,157		24,903
Number reported isolated.....	1	5	3				1		1	1		12
H.P. reported isolated.....	20	636	162				1,250		307	5		2,380
Number reported other power.....	6	14	4				3	1	2	2		32
H.P. reported other power.....	920	3,709	955				3,005	600	2,100	370		11,659
Number reporting employees.....	6	22	5	2	1		3	3	2	5		49
Number employees reported.....	71	947	76	35	3		65	50	81	266		1,594
Estimated total H.P.....	2,518	54,754	5,839	1,890	492	615	10,857	4,676	4,880	3,255	82	87,858
Estimated total employed.....	192	3,913	228	131	18	16	152	232	162	904	6	5,954
PUMPING												
Number listed.....	6	101	8	9	3	2	3	5		15		152
Number reporting.....	5	79	7	8	2	2	1	2		13		119
Total H.P. reported.....	1,829	74,395	3,704	11,100	3,250	155	40	860		5,738		101,071
Number reported power company.....	2	79	5	8	2	2	1	2		12		113
H.P. reported power company.....	350	68,806	1,904	10,800	3,250	35	40	715		4,282		90,182
Number reported isolated.....	1	3	1							1		6
H.P. reported isolated.....	19	2,054	1,000							106		3,179
Number reported other power.....	4	9	1	1		2		1		3		21
H.P. reported other power.....	1,460	3,535	800	300		120		145		1,350		7,710
Number reporting employees.....	1	28	3	4	2	2	1	1		3		45
Number employees reported.....	11	299	14	58	61	9	2	10		12		476
Estimated total H.P.....	2,194	95,111	4,232	12,487	4,875	155	120	2,150		6,619		125,943
Estimated total employed.....	66	1,080	40	130	90	9	6	50		80		1,551
SUGAR												
Number listed.....		26	20	2	1				10	2	3	64
Number reporting.....		11	15	1					3	2		32
Total H.P. reported.....		37,764	22,140	450					34,971	337		95,662
Number reported power company.....		10	6	1					2	2		21
H.P. reported power company.....		13,935	2,040	450					2,011	337		18,773
Number reported isolated.....		4	7						3			14
H.P. reported isolated.....		13,679	16,200						5,260			35,139
Number reported other power.....		4	3						3			10
H.P. reported other power.....		10,150	3,900						27,700			41,750
Number reporting employees.....		10	4						2			16
Number employees reported.....		5,906	952						2,600			9,458
Estimated total H.P.....		89,258	29,520	900	450				116,570	337	1,350	238,385
Estimated total employed.....		15,355	4,760	400	200				13,000	400	600	34,715
TEXTILES, LEATHER AND RUBBER GOODS												
Number listed.....	10	283	31	4	12		1	60	23	59	3	485
Number reporting.....	3	70	14	1				15	8	18	1	127
Total H.P. reported.....	1,511	27,882	4,164	3				2,840	352	1,037		37,789
Number reported power company.....	3	63	13	1				15	8	17		120
H.P. reported power company.....	1,461	21,646	3,944	3				1,860	345	1,012		30,271
Number reported isolated.....		10						1				12
H.P. reported isolated.....		2,006						150				2,156
Number reported other power.....	1	8	1					4	1	2		17
H.P. reported other power.....	50	4,230	220					830	7	25		5,362
Number reporting employees.....	1	71	17	1				10	7	18	1	125
Number employees reported.....	4	7,776	1,107	12				585	186	814	2	10,488
Estimated total H.P.....	9,054	133,787	8,384	186	1,345		128	11,564	962	3,780	384	168,496
Estimated total employed.....	532	30,481	2,195	167	78		20	3,348	5,427	2,518	6	44,812
MISCELLANEOUS												
Number listed.....		185	36	3	5	3		31	12	39	3	317
Number reporting.....		130	20	2	1			21	1	12		197
Total H.P. reported.....		67,704	2,981	758	133			6,147	5	4,913		82,641
Number reported power company.....		97	16	2	1			16	1	10		143
H.P. reported power company.....		47,799	2,076	758	133			2,197	5	3,028		55,996
Number reported isolated.....		42	5					1		1		49
H.P. reported isolated.....		13,299	755					200		85		14,339
Number reported other power.....		15	1					12		1		29
H.P. reported other power.....		6,606	150					3,750		1,800		12,306
Number reporting employees.....		48	7	1				8		4		68
Number employees reported.....		4,111	69	13				293		174		4,711
Estimated total H.P.....		102,326	4,912	1,508	665	15		10,194	60	15,967	399	136,044
Estimated total employed.....		24,023	593	35	55	33		602	132	1,697	33	27,203

DISTRIBUTION AND POWER USAGE OF 6,227 WESTERN INDUSTRIAL PLANTS (Continued)

***Isolated plant** as used below means industrial plant generating own electricity.
†"Other power" means industrial plant generating power other than electricity.

	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming	Totals
ALL INDUSTRIES												
Number listed	107	2,885	546	191	210	71	49	755	274	1,078	61	6,227
Number reporting	61	1,179	303	76	94	46	23	442	114	415	29	2,782
Total H.P. reported	60,026	724,627	191,977	45,945	425,583	44,043	17,253	279,408	141,511	210,667	45,919	2,187,259
Number reported power company	35	1,074	228	69	87	44	8	291	105	314	23	2,278
H.P. reported power company	17,487	558,263	92,257	34,393	400,203	25,853	4,825	109,264	103,677	84,225	43,828	1,474,275
Number reported isolated	11	122	67	7	8	4	9	41	10	80	3	362
H.P. reported isolated	26,677	66,611	58,218	4,157	2,340	13,705	3,053	40,702	6,367	70,019	1,526	293,375
Number reported other power	26	248	58	10	22	5	10	259	20	118	9	785
H.P. reported other power	15,862	99,753	41,502	7,395	23,040	4,485	9,375	129,442	31,767	56,423	565	419,609
Number reporting employees	26	860	146	38	43	18	18	184	61	279	19	1,692
Number employees reported	2,222	134,740	13,858	2,119	19,014	515	3,505	15,980	6,759	27,421	1,727	227,860
Estimated total H.P.	90,020	1,885,583	309,893	82,921	512,564	49,691	35,056	425,656	272,249	604,877	61,838	4,332,348
Estimated H.P. power company	26,287	1,453,786	149,370	62,192	483,324	29,220	10,273	159,684	199,560	242,456	59,058	2,992,840
Estimated total H.P. isolated	39,968	173,473	93,897	7,462	2,562	15,453	6,169	64,276	11,978	200,819	2,040	618,097
Estimated total H.P. other power	23,765	258,324	66,626	13,267	26,678	5,018	18,614	201,696	60,711	161,602	740	837,043
Estimated number employed	10,903	437,614	52,828	19,492	93,883	2,679	7,197	66,659	40,613	106,211	7,439	845,518

69 per cent of all power. Compared to eastern conditions, where isolated steam plants furnish a much larger percentage of the industrial power, this shows a very great dependence upon power company lines.

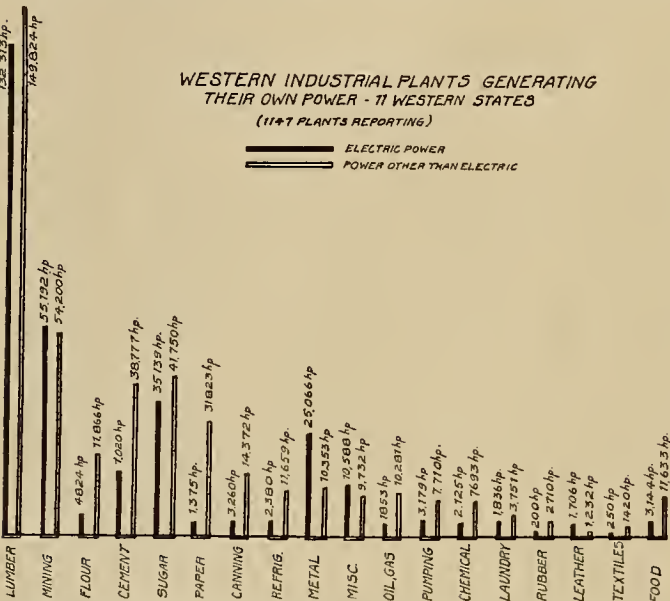
Of the 1,147 plants which reported generating their own power, 643 also purchased electric power from the power companies, indicating that the steam

to generate it. Paper mills use mostly power company service, although practically all of them use some other form of power in connection with their processes. Sugar mills are large users of steam and often generate their own power as a by-product. Cement plants purchase practically all of their power, using fuel only in connection with their kilns. Mines, in spite of their often remote locations and proximity to mountain sources of power, purchase most of their electricity — and most of the power of their own generation reported is auxiliary service. The southwest country where power company service is not so widely extended and where water power is not so generally available, furnishes most of the isolated power plants at the mine.

Eighty-eight per cent of the power independently generated is in plants using some form of steam power, the remaining 12 per cent being isolated water power plants. Of fuels used, it is interesting to note the extensive use of wood waste in Washington and Oregon, the general use of oil in California, Arizona and New Mexico and of coal in Colorado and Nevada. California, Idaho, Montana, Washington and Oregon furnish most of the independent water power plants. The average size of plants generating power by water was 600 hp., with 843 hp. as the average for plants using steam.

With the exception of lumber mills, which make up practically one-half of the power thus generated, mines in districts not served by power companies, which make another 15 per cent, and certain types of food plants which use steam and generate power as a by-product, the isolated plant in the West is of little importance.

The entire survey brings together 5,723 plants using electricity, with an average installation of 308 hp., which together furnish one of the major markets for electrical equipment in the country, a market which is increasing in importance with strides which can be indicated only by the impressive growth of the last decade. If the manufacturing of the West progresses during the next ten yeears at the same rate which was shown during the past decade, the installed capacity of electrical equipment will have reached the total of 17,151,960 hp. by 1930 which means a market for motors amounting to 13,500,000 hp. in the West, not to mention replacements of equipment giving out or growing obsolete.



Over fifty per cent of the plants generating their own power are in the field of lumber and wood products. Mining plants represent another fifteen per cent and the remainder are distributed in small numbers among all other industries.

was used for some essential part of their own process. The 504 plants using no power company service are over half of them lumber mills and plants having waste wood as a by-product. The list contains 262 lumber mills, 23 plants handling miscellaneous food, 22 laundries, 19 chemical plants, 19 canneries, 44 flour mills, 31 mines, 12 refrigerating plants, 10 sugar mills, 10 metal works, 9 cement or brick plants and the remainder scattered through the fields of paper mills, city pumping plants, oil fields and leather goods factories. In horsepower, the lumber mills and mines predominate.

The entire table of isolated plants may profitably be studied in connection with the chart indicating sizes of individual plants. Of the industries having particularly large units, it is interesting to note that the oil fields are almost completely electrified and find it cheaper on the whole to purchase power than

Inter-Industry Cooperation Keynote of Los Angeles Convention

Industrial Conference Proves Climax of Sixth Annual Convention of the Pacific Coast Electrical Association at Los Angeles, May 31-June 1. Industrial Men Warn of the Danger of Radical Legislation

A NEW appeal for the better understanding of the problems of all industry by the electrical group and the reciprocal importance of the electrical industry to all western development was brought out at the sixth annual convention of the Pacific Coast Electrical Association recently held at Los Angeles, May 31 to June 1. Over 500 delegates and guests attended the meetings and the enthusiasm and a regular attendance at sessions which prevailed made the gathering one of historic importance in the records of the Association.

Interdependence of Western Industry

Following a brief address of welcome on the part of Geo. E. Cryer, mayor of Los Angeles, in which he pointed out the importance of electricity to the growth of that community, President A. B. West summarized the work of the past year and that of the coming convention. He said in part:

One of the striking lessons of our time is the interdependence of all industry and of all classes. The complex social and economic structure, which modern civilization has built up, is so inter-related and tied together that no element can be injured or destroyed without weakening the whole edifice. In a broad sense we have a common destiny and must prosper or fail together. This is peculiarly true of the electrical industry, which today renders a basic service indispensable to nearly all other lines of business and industry. As a result, a decline in any one of our important industries will at once adversely affect the earnings of the electric utility. On the other hand, anything which tends to impair the service of the electric utility, or its ability to expand that service as required by the increasing demands of its consumers, strikes a serious blow, not only at the utility itself, but at the whole industrial life of the community.

We are hopeful that these conferences will be fruitful in developing between our industry and those it serves, that spirit of helpfulness and cooperation which is the inevitable consequence of a more intimate knowledge of each other's problems and a fuller realization of mutuality of interests.

Over 112,000 individual security holders are reported by eight of the power companies of California alone, according to Mr. West. This "customer ownership" idea was started by the Pacific Gas and Electric Company in 1914 and the West still leads in its development. The idea has since spread to all parts of the country and is everywhere recognized as an ideal relationship between the power company and the public.

State Threatens Private Initiative

"In view of this situation," said Mr. West, "it is somewhat surprising that the year 1922 finds the electrical industry of California challenged to show cause why it should not be taken out of the hands of private endeavor and initiative, to which it owes its present development, and given over to public ownership with political management. The sponsors for this movement, in launching their campaign, declare that those who are now and those who have heretofore engaged in the hydroelectric industry of California have failed to make good and that 'the state must do the job.' In making that argument they have employed the only valid argument that can be advanced for taking a going, constructive enterprise from its creators and turning it over to ownership by the state."

In challenging this accusation of failure on the part of private companies, Mr. West pointed out that under private ownership of public corporations in California there has been developed the greatest interconnected system of power transmission lines in the world—a super-zone far exceeding that planned for the East as one of the major projects of their coming decade.

In California and under private ownership, there has been developed an unparalleled use of electricity by industry and in the home. In 1920 83% of the dwelling houses of California were wired as against 35% for the United States. The whole state has been griddled with transmission and distribution lines so that the inhabitants of the rural and sparsely settled districts have at their command electric service on an equal basis with those of the urban communities. The service is rendered generally at uniform rates which are among the lowest in the world. The average rate per kilowatt-hour for power generated, paid by California consumers in 1921, was only 1.46c., compared with 2.17c. for the balance of the United States. As a result of these conditions, the per capita consumption of electric current in California is three times that of the other sections of the country. Together with this general use, is an unprecedented utilization of electricity on the farm, both for irrigation and in the household and barn, far exceeding that of any other part of the world.

Tremendous records in transmission and construction have brought California to the point where it leads the world in electrical development and it is today the Mecca for visiting engineers and Water Power Commissioners from all over the world, who are desirous of studying the problems of long distance transmission and distribution of electric power.

"These records," Mr. West went on to say, "have been made under private ownership. I have been unable to learn of a single advance, a single achievement along constructive and progressive lines that has been made in this country in the electrical industry under private ownership, which tends always to discourage initiative and innovation, to harden whatever it lays its hands upon into fixed, unyielding conformity with bureaucratic routine."

Importance of Safeguarding Electrical Development

In concluding his remarks, the speaker pointed out the constructive nature of the electrical industry. He said:

"The electrical industry is probably the greatest material constructive force that the world possesses today. It is increasingly the factor on which mankind must depend to make good the tremendous waste and destruction of the World War; to create new industries and rehabilitate and revivify old ones; to ameliorate the hardships and drudgery of the toiler and the agricultural producer; to increase the comforts and conveniences of remote communities and farms, thus helping to restore the balance between city and country; to replace, without economic upheaval and distress, the world's dwindling oil supply, and, by cheapening transportation and production, reduce the cost of living, thus widening that margin of leisure and security in which mankind finds the finest amenities of life."

In a few words, Frank W. Smith of the United Electric Light and Power Company of New York, president-elect of the National Electric Light Association, expressed the interest of the national body in western development, and pointed out that the problem of the state generation of power was nationwide in its significance. Such a move, if started, would not only spread to other industries in California, but to other sections of the country.

Reports from the secretary and treasurer and appointment of committees concluded the opening session.

Technical Problems Discussed

Problems of generation and distribution were discussed at a series of well attended sessions of the Technical Section and plans laid for continuing the



Delegates and guests attending the sixth annual convention of the Pacific Coast Electrical

work of the committees during the coming year. Most of the problems of 220,000-volt transmission have been worked out by the companies contemplating its early adoption, as instanced by the reports from the Southern California Edison Company and the Pacific Gas and Electric Company, and progress on the Big Creek and Pit River installations is well under way.

An appeal was made for the standardization of safety rules and it is hoped that the N. E. L. A. standards may be adopted and adapted in most cases to meet western conditions. The use of wireless is reported by several of the companies and there was a general feeling that it will prove of the greatest assistance in mountain construction work and in the case of emergency disruption of wire communications with mountain power houses. The question of meter testing is one of particular importance in California at the present time because of the forthcoming rules of the California Industrial Accident Commission which will require all metal enclosed wiring for industrial establishments. Because of this it will be necessary to make use of special devices in order to facilitate the safe testing of meters under such conditions.

The committee on hydraulic power presented a most interesting report covering an analysis of physical statistics of all of the important hydroelectric installations of this district. The report was divided into ten sections and contains much information of importance. The reports of the underground and overhead systems committees included a survey of progress and of new methods which have been worked out during the past year and laid out a program of work for the next twelve months. Several of the problems involved in the industrial use of power were pointed out and remedies suggested. Manufacturers and the engineering departments of power companies alike have combined to work out devices and equipment to meet the special needs of agricultural pumping plants, oil field conditions and other special problems of western industry.

Promising Field for Domestic Heating

The growing importance of the electric heating load was brought out from many angles, the field of electric ranges and house heating showing a sudden increase of interest on the part of the public during the past year. Especial importance was laid upon the use of electric appliances by the employees of companies selling them and power companies were urged to give special rates to their staff, not alone on the purchase price of the equipment but for the current which is later consumed. In this connection, the proper education of the entire staff of the company from office boy to president in the use of the electric range and water heater had been found most successful in gaining their interest. Manufacturers' representatives stand ready to give such a talk and demonstration at any time. The general opinion of those at the meeting seemed to be that the interest and assistance of the contractor-dealer in pushing range sales was of the utmost importance and should not be overlooked.

Opportunities in the Industrial Field

Much remains to be done in developing the general use of electricity in industrial heating, as was brought out in the discussion of this subject, and the field is a fruitful one for future sales. Successful western installations were reported from the heating of low gravity oil to improve the yield of head wells, sterilizing raisins and oranges and the dehydration of prunes, to the extensive use of electric power in sugar mills. The possibility of using electricity in the prevention of frosts in orchards was suggested as a possibility to be investigated. Inasmuch as the circulation of air prevents the settling of frost, it has been suggested that the use of an airplane propeller or of small heating units with electric fans would solve the problem. The general feeling seemed to be that the power companies should make local surveys of the opportunities existent in the communities served, not so much in new industries, as in those already in operation whose methods could be modernized. Especial emphasis was placed upon the necessity for technically trained salesmen to handle



Association assembled on the lawn in front of the Hotel Ambassador, Los Angeles.

this class of business, as only technically sound installations could benefit either customer or power company.

Increase in the Use of Illumination

The value of actual demonstrations on a reasonably large scale was brought out in the discussion of street illumination. Two sides of the problem revealed the danger of overselling illumination on the one hand, permitting a community to invest beyond its capacity to pay bills—and underselling on the other. The present average costs of street lighting per capita in western communities runs somewhere in the neighborhood of \$1, whereas \$1.50 is nearer a reasonable figure. An interesting sidelight on the importance of good street illumination was brought out by instances where a reduction in street illumination had resulted in an immediate drop in the bills of customers in that neighborhood. The great increase in the use of electricity on sign boards was credited to the improved street illumination which had taught the advertisers the value of light.

Household, commercial and industrial illumination offers many opportunities for improvement, conditions in all these fields being still far behind modern possibilities. It was urged that those selling illumination make themselves thoroughly familiar with the language of the subject. The term "luminaire" was especially recommended for general usage. Although figuring in "watts per square foot" was considered permissible in dealing direct with the customer, the necessity for a scientific basis for figuring illumination was urged, particularly in the case of industrial lighting where each situation must be solved on its own merits.

Although the curbstone contractor will always get a certain percentage of the work, it was suggested that the standards of electrical installations might be kept up by personal interviews with the owner before the house is built, outlining desirable wiring plans. With these specifications adhered to, no matter who gets the job, the foundation is laid for the later sale of adequate fixtures and still later of electrical equipment.

Second Business Meeting

The national interest in western utility securities was emphasized by M. H. Aylesworth in his address before the main business session of the convention. In particular he brought out the point that the heavy investment of insurance companies in such securities had made the 70,000,000 policy holders represented in these companies virtually holders of power company stock. A similar condition holds with the banks, so that in the end it may be said to be the small depositor and the man who has taken out the average insurance policy who are the owners of the private utilities and whose interests are affected when their welfare is threatened. This message is to go out in printed form to the policy holders of all insurance companies. Western securities are particularly popular and in consequence western conditions are watched with especial interest by eastern investors. It is believed, however, that the disastrous results of the Ontario experiment as revealed in the impartial Murray and Flood report are sufficient warning to the voters of this country and no particular anxiety is expressed in regard to the outcome of the water power legislation to come before the electors of California this fall.

An idea of the widespread drift toward the state socialization of industry and an appeal for all industry to be concerned with legislation which affects any one group was given by Ernest Clewe, San Francisco attorney, who spoke on conditions in the field of liability insurance. He pointed out that the Workingmen's Compensation Act of California provided not for a pledging of the state credit, but for a form of mutual insurance conducted by the state—that is, an invasion of the field of private business. The extent of business done has increased from \$500,000 in premiums paid by the state in 1915 to some \$4,880,000 in premiums for 1921, or more than one-third of all insurance business done in the state in this field.

He warned that an attempt was being made to make state insurance monopolistic in California and urged upon those in the electrical industry the neces-

sity of checking the advancement of the state into the conduct of private business in this field if it was not to succeed in other fields as well. Compulsory automobile owners' liability insurance and state warehousing projects have already been proposed, not to mention the State Water and Power Act now before the people.

Committee Reports and Elections

The report of the Committee on the President's Address, made by H. L. Harper of the Western Electric Company, Los Angeles, included an endorsement of the plan of the industrial conference. It was urged that the policy of sending committee representatives from the West to eastern meetings be continued. The work of the Cooperative Campaign was approved and a plea made for its continued support. In particular it was suggested that activities affecting the entire industry should be undertaken periodically on the plan of June Bride Week recently so successfully carried out. Action was urged on the part of individuals and of the convention as a whole to combat the Water and Power Act and it was suggested that the report of the president be printed and distributed to members.

The revised constitution, as presented by A. E. Wishon, vice-president and general manager of the San Joaquin Light and Power Corporation, involved the change of name of the Association to the Pacific Coast Electrical Association and the reclassification of membership. The present arrangement does away with membership classes and provides only for regular members, confined to all those eligible to the N. E. L. A., associate members who may be anyone interested in the electrical industry, and honorary members. The president must, in accordance with N. E. L. A. requirements, be a member of the power company branch of the industry. The revised constitution was unanimously adopted.

Resolutions were adopted thanking those assisting the convention, Mr. Smith and Mr. Aylesworth, the outgoing officers, the Electrical World and Journal of Electricity and Western Industry. Continued support for the Cooperative Campaign was asked. Particular emphasis was laid upon the resolution expressing the unalterable opposition of the Association to the Water and Power Act, as an unjustified attack upon the investors in private enterprises now serving this field and a menace to public welfare.

Officers for the following year were chosen, as follows:

- President—J. B. Black, Great Western Power Company.
- First Vice-President—L. M. Klauber, San Diego Consolidated Gas and Electric Co.
- Second Vice-President—Wm. Baurhyte, Los Angeles Gas and Electric Company.
- Treasurer—J. B. Anthony, General Electric Company.
- Executive Committee—
 - R. A. Balzari, Westinghouse Electric and Mfg. Co.
 - S. Waldo Coleman, Coast Counties Gas and Electric Co.
 - E. B. Criddle, Southern Sierras Power Co.
 - H. L. Harper, Western Electric Company.
 - A. N. Kemp, Southern Californian Company.
 - F. A. Leach, Jr., Pacific Gas and Electric Company.
 - R. M. Masson, Pacific Gas and Electric Co. of Arizona.
 - Glen Arbogast, Newbery Electric Co.
 - Harry Noack, Pacific States Electric Company.

A. E. Wishon, vice-president and general manager, San Joaquin Light and Power Corp.
 Robert Sibley, editor, Journal of Electricity and Western Industry.

Menace of Water Power Act Subject of Industrial Conference

According to the usual custom, the afternoon and evening of the last day of convention were given over to the Pacific Coast Industrial Conference, a gathering of notable industrial men of the West who join with the representatives of the electrical industry in the consideration of mutual problems. The dangers of the Water and Power Bill from the standpoint of the various industries of California were ably presented by representatives from banking, farming and business interests.

In introducing the subject, Wigginton E. Creed, president of the Pacific Gas and Electric Company and chairman of the day, outlined the nature of the proposed legislation. He pointed out the dangers of democracy, which lie—first, in the indifference of the intelligent class and therefore the absence of a constructive program and, secondly, in the success of catch words with the mass of the people.

The proposed bill, according to Mr. Creed, is literally taxation without representation as there is no check upon the five men who would be empowered to carry out the business under the measure—and because, even at the best, it would mean the decrease of revenue to the state through the creation of untaxable properties to the extent of \$500,000,000—a loss which would amount to over \$8,000,000 to the state in this item alone.

The principle involved, if applied generally would at length reduce the source of taxes to one last lone farmer who must then bear the entire burden dropped by the state when it took over self-supporting private business. Tax free bonds in California alone already have reduced the sum which might have been collected in taxes by \$20,000,000.

There is not one instance on record of government extending its activities into the field of business which has not meant a greater burden of taxation for the people. The present cry is for more efficiency in government and this is the end toward which the state should work, rather than an extension to still other activities.

In concluding, Mr. Creed emphasized the interdependence of western development and the fundamental principle that no one can advance if another lag and called upon all industry to recognize the menace of the present situation.

Safeguarding the Future of the West

Robert Sibley, editor of the Journal of Electricity and Western Industry and president of the McGraw-Hill Company of California, presented the story of the great future ahead of the western states if unhampered in their growth, in a survey of western industries which was the result of a five months' intensive study of some 6,000 industrial plants. With a fifteen billion dollar program of capital investment laid out for the next ten years, the West cannot afford to threaten its credit by experimenting with a

principle which is a menace to all industry. The entire development of this district, with its scarcity of fuel and the nature of its enterprises, is so dependent upon cheap and reliable electric power that anything which threatens this field endangers the entire program. An idea of the stultifying effect of state generated power upon the development of a community was given by Mr. Sibley through facts and comparisons of the Ontario, Canada, situation with that in California where private initiative has prevailed.

More important even than this aspect of the situation, however, is the fact that the West as a growing region, must have capital and that capital cannot be attracted except under assurance of stability, of fair laws and just government. The threat of government ownership, if enforced in any one field, would endanger the credit of the whole and imperil the entire development of the West.

The Investor's Viewpoint

The viewpoint of national investment bankers was presented by Howard F. Beebe, Harris Forbes Company, New York, and president of the Investment Bankers' Association of America. Mr. Beebe brought out the national aspects of the situation and the importance of such a measure as the Water and Power Act from the standpoint of those who handle securities and who must place these upon the market.

A committee appointed by the national body of investment bankers has recently made an investigation of the so-called Water and Power Act and their report will soon be ready for distribution to the membership of their organization. They take a stand unhesitatingly against the proposed legislation. They consider that the bill would endanger not alone the market for future securities, but the value of all California utility securities would be lessened. The state has called for tremendous sums of money from outside sources, giving the guaranty of commission regulation as a basis—and it is scarcely ethical for them now to withdraw this security and for the state itself to go into competition in the field.

Other government enterprises of a similar nature have not proven successful, of which Mr. Beebe instanced the New York traction tangle, the Erie canal and the Ontario situation. In general the experience has been that construction took both longer time and more money than was anticipated and that in consequence the interest on money borrowed must be paid by taxes or the sale of other bonds instead of from the anticipated income—a vicious method of finance from any aspect.

The Farmers' Side of the Question

The farmers' interest in both water and power was effectively presented by J. A. Teagarden, regional director of the Farm Bureau of the state of California, in one of the most telling talks of the afternoon.

Water and power were the farmer's greatest assets, said Mr. Teagarden—and tax free securities and tax free lands his greatest enemy. The farmer is suspicious of an untried plan which will inevitably

raise his taxes, however it is looked upon. The Ontario plan which is given as the model for the proposed legislation has provided so ill for the farmer that the Dominion had to provide a subsidy for farm power development in order to bring it somewhat upon a par with city conditions. The present scheme, moreover, is neither government ownership—being rather ownership by a board of five—nor does it promise anything by way of cheap power. "Water and Power at Cost" depends upon the cost, as the country learned during the war under the slogan "cost plus ten per cent." The farmer's attitude may best be expressed by a series of questions:

Why did not the proponents of this measure substitute the Ontario Act instead of the one proposed which it in no wise resembles? Why did they give the Water and Power Board despotic and unlimited power while the Ontario Board cannot spend a dollar or contract for a single project without authority from the provincial government?

Who were the first endorsers of this proposed Water and Power Act? The League of Municipalities.

Why was the clause inserted giving this Board power to contract with the United States and other states regarding interstate waters? What interstate waters have we beyond the Siskiyou, the Sierras, or on the borders of Mexico and the Pacific? There is but one point, southeastern California traversed by the Colorado river.

The bill provides that those nearest the source of supply are to be served first. There is one southern city which has aspirations to become the metropolis of the West, and it may be a coincidence that this city happens to be situated nearest the source of supply. This city is desirous of having an unlimited supply of power that it may become the manufacturing center of the West. This is a very laudable ambition if developed and financed by her own resources, but the farmer does not feel that he should be called upon to pledge his hard-earned credits to develop a city, leaving his own industry unprotected.

They state that each project is to be so thoroughly investigated before being endorsed that it will be self-supporting and pay its bonded debt without liability to the state. If so, then why does it become necessary for the state to underwrite the bonds?

We have created by law a Commission for the regulation of public utilities so that their charges will be just and reasonable. If this Commission is not properly functioning the remedy rests with the people. Some say that the public utilities own the Railroad Commission. Who will own the new Water and Power Board? Both Commissions would be appointed by the same Governor. It would be rather inconsistent for him to appoint the Imps of Hades on one Commission and the Angels of Heaven on the other.

Ontario learned that power distributed to the farmers at cost was prohibitive so they subsidized rural lines by paying 50 per cent of the cost of construction. Water and power to the farming sections of California under the proposed act would likewise be prohibitive.

Under our present system the farmers of California are being subsidized by being furnished power and lights for less than cost, the difference being made up of higher rates charged to the cities.

We encouraged capital to build up the power and light system of our state; we have also encouraged farmers to build up the agricultural interests of the state. How would we as farmers like to have the state empower this Board to take over the state lands and other agricultural lands and interests that they might need, and also give them the power to bond the state so as to furnish farm products to the people of California at cost? We might ask in that case, what does this Board know about farming? Perhaps they know as much about farming as they do about water and power.

The state cannot create money by law. There is but one source of money to develop any public enterprise and that is from the one who has saved it. The municipalities are over-bonded, leaving only the farmer with his unused credits to guarantee the bonds.

Russia tried to create money by law resulting in the developing of but two industries, the paper mills and the over-worked printing press.

Taxing City Investment

The proposed Water and Power Act is a departure from the principles of the national constitution, according to Capt. John D. Fredericks, president of the Los Angeles Chamber of Commerce, and an experiment which would substitute an untried system for that of private initiative under which our present prosperity has been built up. He pointed out the fallacy of the argument that the city or state can get money cheaper than the private individual or enterprise. Money at five per cent, means five per cent plus taxes—which brings the cost of money to the people through this channel to the same level that is obtainable elsewhere. In order to bring out the fundamental truth of this situation and to place matters where they can be readily understood by the citizen who must make the decision, Mr. Fredericks made a plea for the taxation of city owned enterprises and their regulation by the State Railroad Commission.

In general, the voter has less to say concerning the conduct of state owned enterprise than has the stockholder of the corporation whose securities he holds—and the stockholder has the added security that those who conduct his affairs have a responsibility for good judgment and a pecuniary penalty for failure which does not affect those supervising public developments.

Problems of Finance and Regulation

A telegram from Herbert Hoover, Secretary of Commerce, was read at the banquet, which was attended by one thousand delegates and guests. Mr. Hoover expressed his congratulations and his interest in the greater industrial development of the West, so closely associated with the adequate supply of electric energy. With the lowest rates for power of any district in this country, California stands in a peculiarly favorable position.

Under the guidance of John B. Miller, president of the Southern California Edison Company, the program of the evening carried on the discussion of the afternoon session. Speaking to the subject, "Who Will Finance the Electrical Industry," Charles F. Stern, vice-president of the First National Bank of Los Angeles and Los Angeles Trust and Savings Bank, pointed out that the answer to the question depended upon what action was taken by the state at the coming election. He emphasized the fact that private enterprise cannot exist against state competition and that, if the state proposes to go into the power business, it must be prepared to take over the entire field. With the present investment and the construction program which is now under way, the investment of California power companies will be something more than one billion dollars within the next decade. The \$500,000,000 proposal of the Water and Power bill therefore is only a beginning to what the state would have to undertake were it to attempt to serve the industrial growth of the state.

From the standpoint of financing, the power industry as it now stands is in a very satisfactory shape. With securities balanced and the power re-

lationship maintained between stocks and bonds, there is no reason except the interference of government why local markets should not contribute the major share of the money needed. California now ranks eighth in population and fourth in banking resources among the states and the absorbing power of this district alone runs into nine figures yearly.

The importance of developing men, as well as perfecting the mechanical side of engineering was urged by Dr. E. C. Moore, director of the Southern Branch of the University of California. The universities cannot furnish finished workmen, he pointed out—only high grade apprentices—and he placed the responsibility for further development upon the industries themselves who must make provision for training within their own organizations.

Charles K. Field, editor of *Sunset Magazine*, offered a new substitute for the laborious methods of power generation in a delightful scheme for power development compounded from tides, coral reefs and imagination—and a serious word on the dangers of the present situation which threatens the public service industry from a different angle.

The Case for State Regulation

Chester H. Rowell, member of the California State Railroad Commission, spoke forcefully on the necessity of safeguarding the institution of commission regulation. He summarized the growth of the power industry in the West from a state of chaos, with many small companies to one of order and then of power, which power was recognized as a necessity but also as a condition involving the possibility of abuse. State regulation was the outgrowth of this situation—a system which was inaugurated for the negative purpose of keeping the power company from robbing the people, but which has grown to fulfill the positive function of initiating constructive policies, of supervising and standing back of utility financing and of maintaining that golden mean in the matter of charges for service which is to the advantage of customer and company alike.

"Progressive regulation must go on," said Mr. Rowell, "but it must stop short of management." He went on to analyze the healthy condition of the power industry in California at the present time and expressed the belief that "the industry in California is safe and California is safe under the industry."

Mr. Rowell expressed the attitude of the commission toward the electrical utilities by saying in conclusion, "We are satisfied with you and we think the people are satisfied with you."

Trip to Catalina Island

A trip to Santa Catalina Island, enjoyed by many of the delegates and ladies as guests of the southern California power companies, concluded the program which included many entertainment features. The excellent attendance throughout and the interest shown in discussions, as well as the inspiring conference of the last day led to many expressions of opinion that this was the finest convention ever held by the Association.

Self Improvement in Salesmanship

A University Study Course for the Man who Meets the Public in Every Line of Business

By WILLIAM A. RUSSELL

Professor of Sales Management and Advertising, University of Washington

THE BUYER OF THE GOODS

Having discussed the methods by which the buyer is influenced, and the motives which make people buy goods, we will now turn our attention to the various types of buyers with whom the average salesman is thrown in contact. There are those among us who are eternally bashful or always cocksure, who are habitually taciturn, or unstoppable talkers.

As every man or woman represents the combination of some types from all the three classifications we must consider all the three separately because our actions in selling must be so modified and adjusted as to satisfy the peculiar requirements in each instance.

The Professional Buyer

The professional buyer may be a retail merchant, a department manager in a large store, the buyer for a wholesale house, or finally the purchasing agent of an industrial concern. In all these cases he does not buy things for his personal use but exclusively for the purpose of further resale "as is", or—if he buys materials or supplies—for the purpose of using them in profit-making manufacturing processes, and he does this buying as a "job" for which he is paid by his employer.

Do not try to sell something to a professional buyer unless you can prove beyond any doubt that this purchase will be of direct profit to his house. Optimism and general cheerfulness will never be accepted as proof. You will have to "show" him with figures and other unassailable "dope".

Do not try to sell him anything under false pretenses as to quality. You may succeed in fooling him only once, and if you do so succeed the given buyer will never forget that you fooled him.

Do not try to sell a professional buyer unless you have studied his needs and the needs of his special group of customers very thoroughly and are able to prove to him that your goods are adapted to these specific needs—he is not buying on general principles but only for one definite purpose.

You must be able to show him in the very first few moments of your talk that your goods have a definite relation to his own business. Being a busy man whose time is not his own he will generally see you if he has any reason to think that seeing you will be of advantage to him; but he will just as quickly dismiss you if he thinks that what you talk about is of no interest to him in his line of business. Hence you must be prepared for a clear and concise statement of your advantages. No long wind-up, no vagueness, no generalization will get you anywhere.

To summarize: Study your own goods from the angle of the professional buyer's needs and profits and prepare your sales-talk carefully—first, to interest your prospect right from the opening sentences, and second, to prove to him beyond doubt every point you wish to make.

The Specialty Buyer

Into this class belong retail buyers of articles which are bought seldom, have a long life, and hence do not call for early repeat orders.

The purchasers of most electric appliances belong into this specific class, as well as the buyers of electric fixtures, motors, and apparatus in general.

The most typical characteristic of this class is that its members are either quite indifferent to the goods offered or else antagonistic to the salesman offering such goods.

Such indifference follows naturally from the fact that most people are by nature conservative, and having lived and worked so long without the given article feel that they might just as well get along without it. And the opposition to the salesman is a result of the resentment everybody feels towards a "butter-in" who is trying to take his money away and, in general, attempts to interfere with the peaceful and well-regulated flow of life. To such people the salesman is an intruder and a disturber of the peace against whom a defensive attitude is the instinctive one to take.

The buyer of this type does not usually come to the place of the seller to be persuaded to buy the goods. In the majority of cases he has to be tracked to his native habitat and attacked in his lair. To find, interest and close this type of buyer requires on the part of the salesman the exercise of all the judgment, tact, knowledge and ability that is in him, and if salesmanship were paid for on the basis of effort and skill required to make the sale and not on the basis of the money value of the sale, the canvassers or house-to-house salesmen would be probably standing near the head of the list of high-paid salespeople.

It is particularly while dealing with this class of buyers that the salesman should have at his command a good knowledge of class-habits and social customs; of the peculiarities of old and young people; of the complex interrelations between married couples, and between parents and children; of the eternal conflict between social ambitions and lean purses, between personal comforts and social aspirations; and of the thousand and one human habits, customs, prejudices, superstitions, ambitions, limita-

tions, self-denials, sacrifices, egotisms and altruisms, traditions and revolts, which make up the individual, family, and group life of man.

While this type of selling is of a rather strenuous type and is regarded by many as an undignified and unremunerative occupation, everybody aspiring to master the finer points of salesmanship should at some time of his or her life devote at least one or two years to canvassing and—if you please—"peddling." Under no other conditions can that knowledge of human nature and that endless and unflagging tact be acquired which separate the true and eventually successful salesman from the mere sales clerk or order-taker.

Courage and perseverance; complete mastery of the article to be sold; familiarity with all possible sales arguments and sales points; endless enthusiasm and unrelenting energy; above all the most intensely human attitude towards the weaknesses and frailties of our fellow man—all these and many more qualities of the highest type are required of us when we undertake the work of canvass selling. There is no other school in which these qualities can be acquired and strengthened as in this kind of selling work.

The Retail Buyer of Staples

This type of buyer is usually the easiest to handle. He comes to your place of business with his mind more or less made up as to what he is or is not going to try and buy. In many cases he tells you directly and immediately just what he wants, satisfies himself that you give him the thing he has asked for and that the price you charged him is the standard price, pays and leaves. This is specifically the type of buyer for whose demands the so-called self-serve stores and the Woolworth type of 5-and-10 cents stores have been created.

Relatively little skill would be required to serve such customers were it not for the fact that many of them do not always know exactly what they want; that others among them ask for things evidently not best suited to their needs; and that all of them usually are not very good shoppers, paying much attention to first price but quite unfamiliar with those technical elements which determine the true usefulness of goods.

The average salesperson in a cash-and-carry store is little more than a glorified parcel-wrapper. And a great number of salespeople in the retail departments of electrical dealers labor under the mistaken idea that with customers of the type now considered the limits of salesmanship lie in order-taking and parcel-wrapping. But other salesmen discover very early the fundamental truth that every retail buyer of staple merchandise who comes to the store is in reality a possible "3-in-1" purchaser: (1) the staple-buyer he thinks he is; (2) a broader staple-buyer than he thinks he is; and (3) a potential specialty-buyer who has come to the store instead of having the salesman hunt him up at his office or home.

The "Three-In-One" Buyer

As I have pointed out before, the average layman coming to the store of a retail merchant arrives

there with an extremely limited knowledge of the goods the merchant has to sell, and this both quantitatively and qualitatively.

Two things follow from this: first, that you can sell this type of customer things which are much better suited to his needs than what he originally asked for; and, second, that there are a great many things in your stock which that specific buyer needs just as badly as the thing he is trying to buy, but in his ignorance of things electrical does not ask for and frequently does not know he can get them at all. It is clearly the job of a good salesman to act as expert adviser to this class of buyer, remembering all the time the human peculiarity common to all of us that we hate to be pestered and to be shown up as ignoramuses.

It follows from this that even the humblest counter clerk should deliberately train himself in the variegated methods of the canvasser so as to be able to apply them—tactfully and within reason—to every buyer who enters the retail store, because every one of these buyers without a single exception is what I termed a little while ago a three-in-one buyer if properly approached by the salesperson.

Store Canvass vs. House Canvass

Every man among my readers knows that it is impossible not to be sold something or other by the barber who attends to the ceremony of our bi-weekly hair-cut. Knowing that there is no escape from this for the victim helplessly bundled up in the barber's chair, I usually patronize that barber who has demonstrated to me that he is a successful salesman by his non-irritating selling tactics.

In other words, the whole thing is really up to the salesman in the last analysis.

But one thing no one among you may deny, no matter how much you may doubt my "3-in-1" doctrine: the person who enters your store is not any more prejudiced against you and wary of your sales talk than the one at whose door you knock during your soliciting adventures. In fact, he or she is less antagonistic to you, less resentful towards your leads, because by coming into your store he or she has deliberately invited you to talk on subjects electrical.

Of the four steps of the selling process: attracting attention, awakening interest, arousing desire, and forcing action, the first is already completed in the customer who calls at your store—no matter what his immediate request is for. The second step is fairly easy and natural due to the inborn curiosity of man towards everything new. There remain only the third and fourth tasks for you to complete.

Two and one half steps with the customer in the store as against all four steps with the customer called upon by a canvasser at his home—over one-third of the work already done—why then do so many among you neglect to train yourself intensively for just this kind of store-canvass selling? Why do so many of you, after I have asked for and bought ten feet of cotton extension cord, content yourselves with asking me—"anything else today," and still maintain that you are salespeople?

Eliminating the Waste in Industry

Shortcuts in Management and New Power Applications Which Have Been Adopted in Western Industrial Plants for Eliminating Waste, Increasing Production and Cutting the Cost of Manufacturing Processes

By LOUIS F. LEUREY
Electrical Engineer

Salvage Eliminates Waste

Sugar Company Devises Unique System for Salvaging Bags and Residual Contents

At the plant of the California and Hawaiian Sugar Refining Corporation at Crockett, California, due to the enormous tonnage of product handled throughout the year and the very high value of this product, every possible contrivance for waste saving has been installed. One of the most effective of these is the system for reclaiming sugar bags and the particles of sugar which adhere to them.

The original raw sugar is produced in the Hawaiian Islands and is shipped from the Islands in jute bags which all have a distinguishing mark to designate the plantation from which they originate. These bags come over in full shiploads of as great as 7,000 to 10,000 tons capacity and are unloaded by slings on to the warehouse floor. Up to the capacity output of the refinery these bags are trucked directly on to a conveying system which takes them direct to the receiving bins of the refinery.

The bag ties are cut and the contents dumped into the main receiving bins and the bags with their residue of sugar particles are thrown on to another conveyor system which conveys them to a large bag laundry. Here the bags are put through the laundry and hot water used to leach out the remaining sugar which is ultimately recovered by the process of reboiling and evaporation. The wet bags pass on to another conveying system which delivers them to the drying station.

At this station a most ingenious conveying system has been developed consisting of a single line chain conveyor to which the bags are clipped, very much like clothes are pinned to an ordinary clothes line. This conveyor starts out from the drying station, going to the boiler room over the tops of the main boilers and doubles back on itself many times so that the bags go back and forth over the boilers until they are finally dried by the waste heat. The magnitude of this installation can be appreciated when it is noted that approximately 10,000 bags are handled in an eight-hour shift.

The drying conveyor is in continuous motion at a very low rate of speed, the wet bags being pinned on and the dry bags being removed at the drying station without stopping the chain.

The dried bags are removed from the conveyor chain and thrown on to another conveying system which delivers them to the plant's bag factory. At

THIS DEPARTMENT

will be devoted to a discussion of the various problems of waste in industry as they affect western industrial plants. Readers are asked to aid in the solution of the most vital problems facing industry by sending in accounts and pictures of the various practices for combating waste, which have been adopted in plants with which they are familiar. It is only by thus co-operating with Mr. Leurey that the fullest service can be rendered. Space rates will be paid for all material which is published.

this point they are sorted out—the good bags going direct to the printing press, and the torn bags going to the patching station where they are repaired and then delivered to the printing press.

In the meantime, the bag factory has been making up an inner white lining bag and as the used bags come from the printing press these linings are inserted and the bags are then delivered to the plant's packing room where they

are packed with the various grades of refined sugar and finally delivered to the warehouse by the same conveying system which brings in the raw sugar.

This complete installation is a very fine example of comprehensive labor and waste saving, covering as it does the reclamation of valuable product and the recovery of valuable bags, the utilization of waste heat, and the minimizing of labor operations by a comprehensive and efficient conveying system.

Provision for Comfort of Plant Force Increases Output

The practice of building a cafeteria by industrial plants has become so widespread throughout the West as to have become almost commonplace and the value of these features in connection with the plant's operation is so well established as to be beyond question.

This feature can always be justified in types of plants which have permanent operating conditions and large groups of operators working under definite shifts. However, there are other



MILL DEMONSTRATES ADAPTABILITY OF ELECTRIC TRUCK

The flexibility of the electric truck makes it particularly adaptable to many classes of industrial work. Various kinds of booms, special loading and unloading devices and many other features have been designed to increase its uses. This special truck used at the plant of the Portland Lumber Company is constructed so as to enable it to automatically unload its cargo of lumber at any desired point. Batteries and operating machinery are carried on the sides leaving the center of the truck entirely free for loading.

plants in which the investment would be prohibitive.

The Union Sugar Company at Betteravia, California, which operates a sugar beet factory for approximately 100 days in the year, has secured the advantages of a cafeteria for its operators without a large investment which would ordinarily be necessary.

Meals are prepared at the company hotel for the operators on shift and a wire screened area has been equipped with tables in a spare corner of the main factory floor. Warming facilities are provided and the food is brought from the hotel and served hot to the men at noon for the day shift and at midnight for the night shift.

During the 100-day campaign, factories of this type generally conduct very intensive operations and conse-

quently it is of the greatest advantage that operators working under this strain have hot meals served them under conditions which do not take them very far away from their stations for long periods.

It would seem that this same system could be applied with equal advantage to canning plants or other plants having seasonal conditions.

Another company carrying on continuous operations has a regular cafeteria established which has added a feature of great attractiveness to the noonday meal. The operators in this factory are mostly foreign born and a great many of them are music lovers. Musical instruments are provided in the cafeteria and each day at noon impromptu concerts are given after lunch with dancing on the floor of the cafeteria.

ing characteristics of the motors were preserved and the function of the fan was to produce a partial vacuum into which the motor could discharge its heated air. In this way not only was heated air removed from the vicinity of the motor, but the volume of air passing through the ventilation ducts was very materially increased.

By actual measurement, based on temperature rise experiments before and after the installation of this ventilating equipment, each motor had been increased by 60 hp. of continuous capacity. The total cost of this installation was \$1400 so that the additional power was secured at an average approximate cost of \$12 per hp. By the addition of this capacity it has been possible to operate these mills continuously at 1,750-barrel capacity or a total increased capacity of 500 barrels per day for the two mills. Assuming the average cost of flour at \$10 per barrel, this simple installation has enabled the company to increase its average daily production output by \$5000.

There are undoubtedly very many cases throughout industrial plants where the capacity of the drive constitutes a limitation of the output of the driven machine. When the drive is of sufficient importance there is no question but that a properly designed ventilation system will often produce exceptionally good results. The failure of most attempts at ventilation is due to not taking into account the natural characteristics of the motor. This often results in the cooling of one part of the motor and the still further over-heating of another portion of it.

It is only necessary to remove the heated air which is discharged by the motor because this heated air is continually redrawn through the motor windings and finally pyramids into a high temperature condition beyond which the windings can not safely exist.

Electric Heat Increases Output of Low Gravity Oil Wells

Production from low gravity oil wells can be increased 100 per cent through the application of electric heat, according to a discussion brought out at the commercial session in connection with the recent convention of the Pacific Coast Electrical Association in Los Angeles.

A recent test at one of the California oil fields in the case of a low gravity or "head" well demonstrated the feasibility of the scheme. A 5-kw. heater consisting of four sections was placed around the well casing before the pumping commenced. Actual measurement showed an increased production of from 50 to 75 per cent. In the case of a 10-kw. heater production was increased 100 per cent. It was determined that the cost of operating such a heater averages \$20 per month per well.

Low gravity or "head" wells can only be pumped approximately eight hours out of twenty-four. The application of the electric heater greatly increased the pumping period.

It is believed that there are unlimited possibilities in the application of electric heat to oil production in low gravity districts, not only in pumping from the wells but also in transporting the oil from the field to the refinery or to the shipping point.

Ventilation of Motor Increases Output of Plant

Simple Installation at Plant of Sperry Flour Company at Vallejo
Adds 60 hp. to Capacity of Motor at Cost of \$1400

During 1917 the Sperry Flour Company built two modern 1500-barrel milling units at South Vallejo, California. Each milling unit was equipped with a 400-hp. wound rotor motor directly coupled to the main milling shaft. These motors were mounted on top of a concrete foundation so that their center line stood at the same height as the main mill shaft.

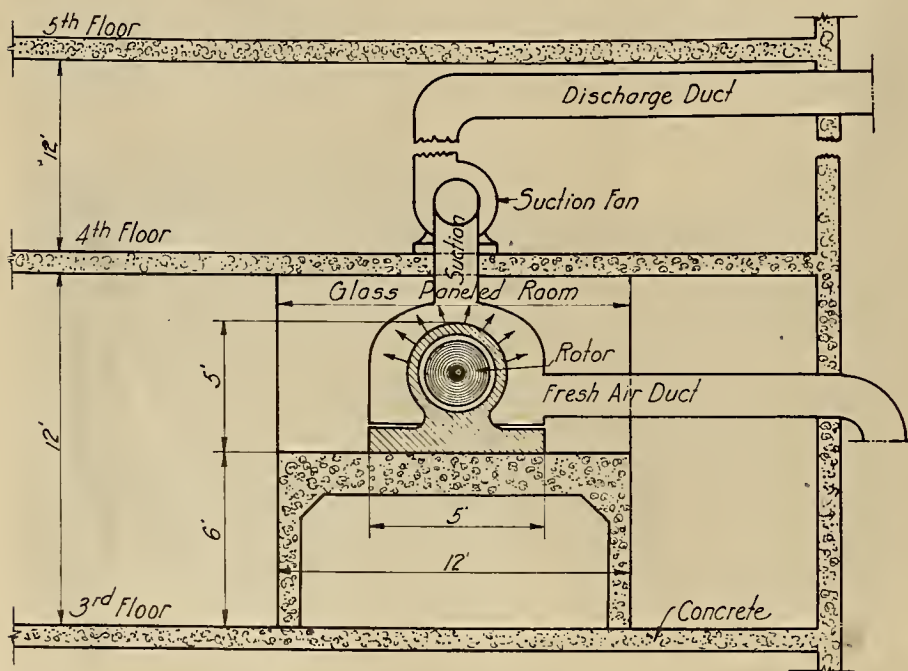
After the mills were placed in operation it was discovered that the milling machinery could develop a capacity of 300 barrels beyond what had been thought to be its maximum capacity. However, the motors were unable to develop, without destructive heat, sufficient capacity for any greater output than 1500 barrels.

As these motors were of very low speed and of an expensive type, it was impractical to trade them in or to pur-

chase motors of larger capacity. After a careful investigation it was decided to secure additional capacity by forced ventilation. In the scheme carried out the motors were enclosed in a glass-paneled room with sheet metal wainscoating, and ducts of very liberal capacity connected this room with the air outside of the building. On the floor above high efficiency ventilating fans were installed which were driven directly from the main motor shaft.

This motor discharged its heated air radially around approximately three-fourth of its circumference. The discharge ducts were enclosed by a sheet metal housing and connected by a sheet metal pipe to the suction side of the fan, the discharge side of this fan being conducted by a duct through the outer wall of the building.

By this method the natural ventilat-



A diagram of the installation of a motor ventilating system at the Vallejo (Cal.) plant of the Sperry Flour Company. The system does not interfere with the natural circulation of the motor. It cost but \$1400 to install and increased the capacity of the motor by 60 hp. The output of the mill operated by this motor was increased 250 barrels per shift.

Western Dealer, Jobber and Agent

Business building suggestions for the store—Distribution and warehousing methods—Advertising and sales promotion ideas

Electric Range Sales Stimulated As Result of Demonstrations

Electric range sales in the Seattle district were recently increased following a series of demonstrations lasting over a period of several weeks given under the auspices of the City of Seattle's Lighting Department and the Puget Sound Power and Light Company.

The first demonstration was given by the municipal interests in the lighting department's show rooms. A competent demonstrator was employed and the thousands of housewives who visited the show were given instructions on operating the electric range as well as demonstrations of its efficiency. As an inducement to bring interested women to the demonstrations, tickets were given to each visitor entitling her to a chance on a range which was given away free at the end of the show. This inducement served to attract a large number of housewives to the show.

The Puget Sound Power and Light Company conducted its demonstrations in the show rooms of the commercial department. Actual demonstrations of electric cooking were given, the demonstrations taking the character of a cooking lesson, as recipes for the various dishes were given to the housewives.

No attempts were made during the demonstrations to sell ranges or any other type of electrical appliances, which were also displayed. At both shows overflow crowds of housewives were entertained and valuable missionary work done by those in charge.

Getting Selling Ability from Newspaper Want Ads

Eastern Manufacturer Prepares Series of Want Ads to be Used By Electrical Dealers Who Are Planning Sales Campaigns

Salesmen with selling ability fall into that class to which belongs the "rara avis." Illustrative of this fact are the multitudinous salesmanship courses offered for their improvement and the diligent search on the part of those who have something for sale to find the right man to sell it to the public. The employing of the right kind of salesmen is a problem which must be faced by every electrical dealer who at some time or other puts on an intensive campaign for the sale of some particular appliance. Oftentimes he is unable to secure trained salesmen, but must take green material and give them a course in the elements of the subject under the tutelage of a competent sales director.

In order to aid the dealer who is planning such a sales campaign in securing good salesmen, the Apex Electrical Distributing Company has prepared a list of want ads to be used in the columns of daily newspapers. All of the ads have been actually tested and those given are the ones which have proved to be the most successful. Some of the ads are reprinted below for the benefit of those dealers who are planning intensive campaigns for the sale of electrical appliances. The ads follow:

DON'T confuse this with the ordinary ad; this is an opportunity of a lifetime;

we have openings for five wire men; experience unnecessary if you are willing to be shown; we teach you the business under experts and pay you liberally while learning, as well as give you definite promotion in accordance with results shown; this is your opportunity to get in on the ground floor of one of the largest appliance organizations west of Cleveland; come in and talk it over; we don't tell you, we show you. Ask for —.

WANTED

A limited number of live wire young men who are anxious to obtain success and learn salesmanship. To the young men who can qualify for this position and who are willing to work hard for success, I will place you with an experienced manager in the field. This is no get rich quick scheme and will pay on the start from \$25 to \$50 a week. Do not apply for this position unless you are able to leave the city at once and have enough money to finance yourself for at least two weeks. Your railroad fare will be paid. This position is with a large eastern manufacturing concern with unlimited possibilities for advancement at all times. See Mr. —,

SALESMEN—Are you satisfied? If so, do not answer this ad; if you want a better position where ability and honest efforts determine your future, where barbers, telegraph operators, bank clerks, etc., are made managers in less than 4 months, come in and let us explain our proposition; we have the largest and best paid organization in the United States; why not join us? Ask for —.

SALESMEN—Here is a proposition you cannot beat; we set you up in business without a cent of expense to yourself; we educate you how to sell our products; we pay you liberally while learning; exclusive city territory; join the largest appliance organization in the country, who will take you regardless of your former experience and place you in a position where you can earn a brilliant future for yourself. If you are 25 or over and want to connect with the liveliest organization in the country where you will be promoted according to results obtained call and see —.

SALESMEN WANTED—by Dallas branch of large manufacturing company. Rapid promotion assured the man that can qualify. Must be hard worker, over 25 years of age, with experience in meeting the public. Address Box —.



Seattle electrical dealers felt the benefit of this electric range demonstration given by the Lighting Department of the City of Seattle. A similar demonstration was also given by the Puget Sound Power and Light Company. The range in the center of the picture was given free to the holder of the lucky ticket drawn from those given to the housewives who visited the demonstrations.

Denver Home is Model of New Household Conveniences

Dwelling Erected Under the Direction of the Denver Electrical Cooperative Campaign
Provides for Utmost in Conveniences and Comforts by the Full Application
of Modern Electrical Appliances



Erected at a cost of \$22,500 and furnished under the direction of a skilled interior decorator, this electric home showed thousands of Denver citizens the many conveniences brought by electricity.



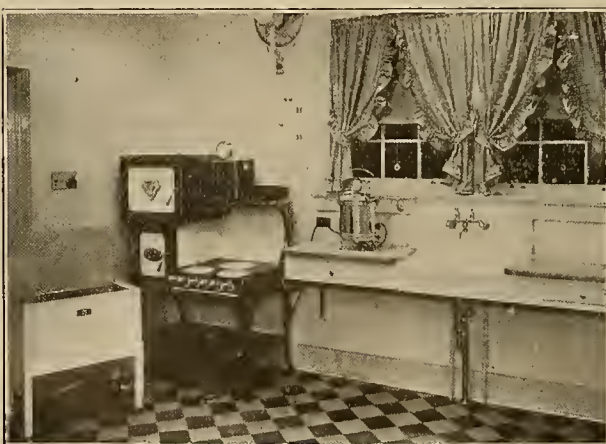
The living room shows the simplicity and good taste used in decorating the home. Note the convenience outlets in the baseboards, the fan, the electric fire place and the two standing lamps.



The master's bed room with its tasteful scheme of illumination, its telephone at the bedside, and numerous convenience outlets. There is a baseboard radio attachment in the lower right hand corner.



One side of the kitchen, looking into the breakfast room. There are plenty of convenience outlets here. The panel board on the left is for the control of twenty-two lighting circuits alone.



Another view of the kitchen showing the electric range, the electric dishwasher and the motor operated ventilating fan. An electrically operated pressure cooker is also part of the kitchen equipment.



The laundry was the magnet for the housewives who visited the home. Its equipment included an electric washer, an electric clothes dryer, mangle and iron. Note the scheme of illumination.

Denver Home Electric Visited by 36,992 People

Record Attendance Secured at Home Display Staged and Directed

By the Denver Electrical Cooperative League

Denver's first electrical home closed in a blaze of glory June 4th after an exhibition period of four weeks, during which time 36,992 people visited the home.

The home was designed, built, financed and exhibited by the Electrical Cooperative League of that city and the record attendance was secured at an advertising cost of less than ten cents per visitor, according to S. W. Bishop, executive manager of the League.

All branches of the industry are reported to be well pleased and similar homes will be provided for exhibition elsewhere in the territory as a result of the successful display.

The attendance ranged from 2,171, the record established on the last day of the exhibition, to 446 on Decoration Day when even a drizzling rain did not seem to dampen the ardor and interest of a number of Denver folks. The average daily attendance was 1,332 and is believed that a new high record has been established for electrical home visitation.

Although the opening of the home was postponed several times due to delay in construction and unfavorable weather, the interest developed during that period was one of the chief factors in securing the record attendance. However, on every one of the five Sundays the home was open the weather was not encouraging and during the last week of the display it rained most of the time, otherwise the League officials in Denver believe they would have secured an attendance of at least 40,000 people.

Immediately after the home was opened, interest developed in improved wiring plans and in many of the appliances displayed at the home. During the first three weeks over a dozen sets of plans of new homes to be built in Denver were turned over to the League for perfecting the electrical layouts and development of a number of ideas featured in the electrical home.

The home was officially opened on May 8th, although private showings were made several days before that date pursuant to an arrangement with the Daniels and Fisher Stores Company, one of the largest department stores in Denver, which cooperated in furnishing the interior of the home.

In order that the display would be systematic, the committee in charge of that feature secured the services of 28 attendants for the two shifts. Each of the principal rooms in the home was provided with an attendant who gave a three minute talk to the visitors on the main features found in that particular room.

The central station provided half of the attendants, with the jobbers assuming responsibility for about one-fourth of the men required. The manufacturers and contractor-dealers furnished the balance of the men, according to Harry D. Randall, district manager of the General Electric Company, who was in charge of the display. He was assisted by F. F. McCammon of the Denver Gas and Electric Light Company,

the vice-chairman of the League's advisory committee.

A definite route was mapped out for the visitors, starting at the front door and ending in the garage, which was built on to the house. The attendant in the front hallway checked and received the visitors in groups averaging about fifteen people, to whom he told the general features and objects of the home electric display. In the garage the visitors were thanked for their attendance and the special booklet entitled, "The Modern Electrical Home," as prepared by the League was given to each visitor.

Charles MacAllister Willcox, a former Denver newspaperman and now head of Daniels and Fisher's was enthusiastic over the project from the start, and his assistant, A. B. Trott, gave orders to make the show up to the minute. The interior decorator of the company, Miss Marjorie McBride, was given carte blanche in the equipment and detail of the interior appointments.

The interior of the home was as striking as the exterior, the architectural scheme being of an Italian renaissance design. The outside walls with a buff stucco facing were neutralized by the Italian blue color of the exterior wood and iron work. Added attractiveness has been given by the variegated colors in the mission tile roof.

In contrast to the methods employed in other cities, the home in Denver was designed, built and financed by the electrical industry. A stock company was incorporated with the leading men in the industry serving as directors and was not developed as part of the League but rather as an adjunct to it. Over \$10,000 was raised by subscription with shares priced at ten dollars apiece and most of this amount came from individuals and not from companies.

The cost of the house is close to \$22,500, according to E. C. Headrick, the League chairman. The valuation of the interior furnishings and equipment was said to be an equivalent amount. Immediately after the display was concluded, the house was put on the market for sale through the cooperative agency of the nineteen leading realtors in Denver.

A. C. Cornell, Rocky Mountain manager of the Western Electric Company, Inc., headed the publicity committee which raised a fund of \$3000 to advertise the home campaign in various ways, chief of which was special sections in the Denver newspapers at the time the home was opened. According to S. W. Bishop, executive manager of the League, over 500 inches of reading matter was secured in the local and state papers during the exhibition.

Invitations were provided the principal central stations in Colorado for attachment to their monthly statements and the number of out-of-town visitors at the home showed the result of the cooperative publicity. Similar invitations were distributed by the Mountain States Telephone and Telegraph Company to the amount of forty thousand.

The Denver Gas and Electric Light

Company prepared and distributed with all its statements an attractive four-color sticker inviting its customers to visit the home. The house furnishing company issued engraved invitations to a special list of 3,000 names, while the music company and building materials company also sent out special invitations.

Another evidence of cooperation in building the home was the system used in making the wiring installation. A committee of Denver contractors headed by W. A. J. Guscott, supervised this feature. The work was done at the manufacturer's cost of material at Denver, plus the labor charge.

The appliances displayed were not connected with this duty but instead were loaned by the jobbers, after having been drawn by lot. The lighting fixtures were secured at manufacturer's cost and were chosen from designs submitted by Denver fixture men.

The total of 197 outlets in the Denver home were classified as follows:

58 Convenience Outlets	
Base outlets	38
Sidewall outlets	15
Floor outlets	2
Exterior outlets	3
67 Lighting Outlets	
Ceiling outlets	37
Bracket outlets (interior)	22
Bracket outlets (exterior)	8
72 Switch Outlets	
Single pole	27
Three-way	32
Four-way	8
Door (jamb)	5

The wiring also provided three outlets for radio telephone connections, one on each floor, with a special room in the basement for the receiving apparatus.

Special nights were designated for the business and professional organizations of Denver and on Thursday night, May 11th, when the Rotary club members and their families were entertained a record of 1,303 was received in three and one-half hours. In the afternoon, various organizations and domestic science classes were shown the home. Later during the display special nights were designated for the residents of all nearby towns.

The electrical industry of Denver, as represented by the cooperative league, is enthusiastic over the successful exhibition and the only qualification heard to make the project completely successful was the satisfactory disposal of the property.

Interest developed outside of Denver indicates a keen desire of the industry to get into the movement. With the extension of the League activities after July 1st, the territory will be made to include all Colorado and parts of New Mexico and Wyoming. As soon as plans can be developed, other electrical homes based on the experience of the first one in Denver will be built in other cities.

The men responsible for the successful financing of the Denver project through the Electrical Home Building Company were Clare N. Stannard, vice-president and general manager of the Denver Gas and Electric Light Company; L. M. Cargo and H. D. Randall, territory managers respectively of the Westinghouse and General Electric Companies. They were assisted by Messrs. Headrick, Cornell, McCammon and Bishop in perfecting the details.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

S. F. Radio Concern Expands

Colin B. Kennedy Co. and Wagner Electric Mfg. Co. of St. Louis Join Forces

W. A. Layman, president of the Wagner Electric Manufacturing Company of St. Louis, Missouri, and C. B. Kennedy, president of the Colin B. Kennedy Company of San Francisco, announce that the two companies have joined in an arrangement to increase the facilities of the Kennedy company in serving the radio field.

The Wagner company has acquired a substantial interest in the Kennedy company which in turn will take over the Wagner company's St. Louis plant No. 2, a six-story building of about sixty thousand square feet of manufacturing space, the extensive equipment of which has been adapted to the manufacture of Kennedy radio apparatus.

The increased manufacturing facilities thus afforded will make it possible to more adequately meet the heavy and constantly increasing demand for Kennedy radio equipment.

Both companies involved in the transaction are recognized as leaders in their respective fields. Mr. Layman states that the joint plan was possible largely because both organizations have built their reputations on the quality ideal.

The engineering personnel includes radio men of national reputation and is of such character as will insure the company keeping abreast of progress in the radio art. The engineering department is under the direction of Dr. Leonard F. Fuller, who is largely responsible for the development of the Poulsen arc transmitter as now used for world-wide communication in practically all the high power stations of the United States Navy. These stations have ratings up to one thousand kw. and include those located at Bordeaux, France, Annapolis, Md., San Diego, Cal., Pearl Harbor, Hawaii, Cavite, P. I., Sayville, N. Y., and El Cayey, Porto Rico.

The Kennedy company will continue to operate at full capacity the manufacturing plant established at San Francisco, the output of which will be used to meet the requirements of the western trade and supplement production at St. Louis.

Farmers Will Benefit by Newly Organized Federal Banks

A comprehensive movement to promote the agricultural development of the West has been launched by nine of the large banks in four of the important business centers with the formation of a group of four joint stock land banks with an initial lending capacity of \$16,000,000. The farmers of California, Arizona, Oregon, Washing-

ton, Utah, Idaho and Nevada will be served by the banks.

One of the four joint stock land banks, with a capital of \$250,000, a paid-in surplus of \$25,000 and the ability at the start to lend \$4,125,000 to the farmers of California and Nevada, will be established in San Francisco. Headquarters of the other three banks will be in Los Angeles, Portland and Salt Lake City.

The joint stock land banks will be a part of the Federal farm land loan system and will operate under charters issued by the Federal farm loan board. It is expected they will be in operation within thirty days.

It is planned to increase the capital stock of the chain of banks and therefore their leading powers from time to time as the need arises.

The nine banks affiliated in the group are the Mercantile Trust company of this city, the First National bank, the Security Trust and Savings bank and the Los Angeles Trust and Savings bank of Los Angeles, the First National bank of Portland and the National Copper bank, the Utah State National bank, the Deseret National bank and Walker Brothers, bankers of Salt Lake City.

Under the provisions of the Federal farm loan act each of the joint stock land banks may lend to farmers up to 50 per cent of the appraised value of their land, and up to 20 per cent of the appraised value of the insured permanent improvements. Appraisers representing the Federal farm loan board determine the lending values. Farmers may borrow to pay off existing loans, or as part of the purchase price of the land, for improvements or for other purposes. Loans are repayable on the Americanization plan. Annual installments cover interest and part of the principal so as to wipe out the whole loan in not less than five nor more than forty years.

The joint stock land banks deposit the farm land loan mortgages securing their loans with the Federal farm loan board, and then are permitted to issue bonds up to the full value of the mortgages, but not in excess of fifteen times the capital and surplus of the joint stock land banks. These bonds bear interest at a rate not in excess of 5 per cent, and farm mortgages bear interest at a rate not to exceed 6 per cent.

Bonds issued by joint stock land banks have been held by the Supreme court of the United States to be "instrumentalities of the Government." Both principal and interest are exempt from Federal, state and municipal taxation.

A total of 207 electrical engineers was graduated from the various technical colleges of Japan in the last class.

Woolen Mills Are Rebuilt

Los Angeles Plant, Destroyed by Fire a Year Ago, Is Again Operating

The Golden State Woolen Mills of Long Beach, California, have resumed operations with a completely modernized plant after having suffered a total loss by fire in April, 1921. Fire-proof buildings, compactly grouped upon a six-acre plot give this company assurance of continued operation without risk of another such shut-down.

In rebuilding the new plant additional machinery has been installed which brings the capacity for weaving up to 75,000 yd. per month, with ample provision for later expansion when necessary. All possible use of electricity has been made, not only in driving the principal machinery but also in many applications of material handling equipment and labor saving devices. The mill will provide employment to 300 people, about one-third being women, and the total payroll will exceed \$30,000 per month at the present output.

Expansion of the clothing industry in the West is expected to absorb an increasingly large amount of the output of the woolen mills on the coast but at the present time more than half of the yardage is disposed of among eastern jobbers and manufacturers and the finished woollens are re-shipped to western trade, according to the statements of C. B. Eyer, president and founder of the company.

Lower Freight Rates Will Aid Northwest Industries

At the present time it is difficult to analyze with exactness what the effect of the 10 per cent reduction in freight rates, ordered by the Interstate Commerce Commission, will have on all commodities, but it is certain that it will have a very material stimulating effect on commerce and industry of the Northwest. Reductions have already been made on livestock, grain and lumber, and it would appear from the report as published that the general cut of 10 per cent will not apply to these items. The report would seem to indicate a substantial reduction on lumber to all territory west of the Mississippi.

While it is felt by many that the decision is conservative it is the general feeling that it is a step in the right direction and will do much good. It is a well demonstrated fact that freight rates do not necessarily mean high revenues and the products of the West with markets at long distances from points of production simply cannot bear what are termed high rates, and for this reason it is believed that the decision will not react unfavorably to the railroads.

Events in Washington of Interest to Western Men

**A Survey of Recent Developments in the Nation's Capital by
Paul Wooton, Special Correspondent of the Journal
of Electricity and Western Industry**

Telegraphic reports to the United States Employment Service covering the employment situation in western states during May indicate a very decided speeding up of industry, particularly in construction, mining and agricultural lines. There is still some surplus of unskilled labor but, on the other hand, a shortage of farm hands is reported, indicating that work is available to those who care to accept that type of employment. The lumber industry is very active and the whole West is busy building highways. Reports to the Federal Power Commission indicate that, with the decided slump in the demand for money, capital is paying more attention to water power projects, with the prospects bright for great development of this resource.

Highway Deadlock Broken

The deadlock on highway policy finally was broken on June 3 when the conferees for the Senate and for the House of Representatives compromised their differences in regard to that legislation. The conference bill authorizes an appropriation of \$50,000,000 for the fiscal year to end July 1, 1923; \$65,000,000 for the fiscal year to end July 1, 1924, and \$75,000,000 for the fiscal year to end July 1, 1925. On the demand of western senators, it was agreed that \$6,500,000 would be made available for forest roads and trails during the fiscal year to end July 1, 1925, as well as for the fiscal year to end July 1, 1924.

One of the principal points of difference was the maximum amount of federal funds which could be used on each mile of road. Under the existing law, \$20,000 per mile is the maximum allowed. The House proposed to reduce that figure to \$12,500 for the next fiscal year and \$10,000 thereafter. A compromise was reached, whereby the maximum of federal participation is to be \$16,250 for the next fiscal year and \$15,000 thereafter.

Muscle Shoals Controversy

After an extended study of all matters involved in the disposal of the government's Muscle Shoals properties, the Military Affairs Committee of the House has decided to recommend the acceptance of the Ford offer provided Mr. Ford will accept certain amendments. The principal point insisted on by the House committee is that the offer is not to include the steam plant at Gorgas. The committee also insists on certain changes in the fertilizer guarantee. Mr. Ford has announced positively that he will not take over the property unless the Gorgas plant is included. The whole matter now is transferred to the floor of the House where discussion is expected to begin in the near future. In the meantime, the Senate has given its approval for an appropriation of \$7,500,000 to reopen construction work on the Muscle Shoals dam.

Coal Prices

While no coal prices have been fixed to cover producing districts west of the Mississippi River, active consideration

as to what constitutes a fair price in those fields is in progress as this is being written. The action of the Secretary of Commerce in calling a general coal price conference seems to have the unanimous support among coal producers and consumers alike. His action resulted in reductions of from fifty cents to one dollar a ton in coal prices in the principal markets of the East and it is believed that his timely action has prevented a flurry in prices.

Bureau of Mines

Particular attention is to be given mining problems in Montana by the U. S. Bureau of Mines during the fiscal year which begins July 1. The matter of ventilation in metal mines is to be given intensive consideration. Two metal mining engineers are being transferred to Butte. Billings is to be made the headquarters of a deputy mineral supervisor. There will be increased attention given oil in that state.

The report that the Bureau's work in Utah will be curtailed during the next fiscal year is without foundation. There will be no reduction whatever in the amount expended by the Bureau in Utah. The impression that there would be a reduction doubtless had its origin in the announcement that some of the ore dressing work being done in co-operation with the University of Utah is to be discontinued. The intention, however, simply is to transfer that work for a year from the laboratory to the actual ore dressing plants at several Utah mines.

Richard C. Tolman has resigned as director of the Fixed Nitrogen Research laboratory of the Department of Agriculture to become professor of physical chemistry and mathematical physics at the California Institute of Technology. He will take up his new duties with the opening of the fall term. He will be succeeded at Fixed Nitrogen Laboratory by F. G. Cottrell, formerly the director of the United States Bureau of Mines.

Maj. Gen. Lansing H. Beach, Chief of Engineers of the Army, left Washington on June 4th for a month's inspection visit in the West. He is interested particularly in a study of flood control methods on western rivers.

In recognition of his services in developing metal research in this country, Dorsey A. Lyon, chief metallurgist of the Bureau of Mines, has had conferred upon him the degree of Doctor of Science by the University of Utah.

With the recent consolidation of the pottery and porcelain plants of the Pacific Manufacturing Company and the Pacific Porcelain Company of Richmond, California, and the incorporation of a new firm under the name of the Pacific Sanitary Manufacturing Company with a capitalization of \$2,000,000 the Pacific Coast now has one of the largest plumbing supply companies in the country. The new company is financed by the same interests as financed the other concerns.

Seattle Holds First Radio Show on Pacific Coast

Seattle's first Radio Show was held at the Dreamland Rink June 5-10. This is the first show of its kind to be held on the Pacific Coast, and was held under the auspices of the Seattle Radio Association. The exhibits at the show were unusually interesting and instructive, and included exhibits by the United States Navy of its receiving station, with a 600-foot aerial erected, and through which messages were received from Nauen, Germany, Lyons, France and other European stations. The Navy radio laboratory was also thrown open for inspection during the period of the show. The University of Washington geological department erected a concrete sound reflector which has a radius of one mile, and also constructed a raised topographical map of the Puget Sound Islands, with miniature ships which show the actual operation of the radio compass.

A feature of the show was the operation of a radio transmitting station by the American Radio Relay League, by means of which radiograms were forwarded to any location in the United States, free of charge. The Western Electric Company presented a vacuum tube film, brought from New York, showing the action of a radiophone. In addition, more than 40 dealers and manufacturers, both national and local, displayed radio equipment. During the show, the Kilbourne and Clark Manufacturing Company held "open house," where visitors were enabled to see the manufacture of radio and wireless equipment, from the reception of raw materials to the finished product.

Public Service Commissioners of Oregon Are Recalled

Fred A. Williams and Fred G. Buchtel, two of the three Public Service Commissioners of the state of Oregon, were recalled by a vote of about 3 to 2 at a special recall election held May 19. T. M. Kerrigan and Newton McCoy, of Portland, were the successful recall candidates against Messrs. Williams and Buchtel.

The recall was invoked against two of the three commissioners over dissatisfaction arising out of and as a protest against a decision handed down by the commission granting substantial increases in telephone rates throughout the state to the Pacific Telephone and Telegraph Company. What may be expected of the new commissioners is speculative. It is reported that the new commissioners have declared their intention to reduce telephone, gas and street car rates immediately. If any drastic action is taken along these lines it is almost certain that any decisions handed down will be appealed to the supreme court of the state, those in touch with the situation believe. A peculiar freak of the election was that although Mr. Buchtel was recalled by a safe majority, his competitor for re-election had only a small plurality over him, indicating that the public did not thoroughly understand the question on which they were voting. Oregon is one of the few states in the Union which has a recall law and this is the first time the recall has been invoked against a public official in that state.

Radio Wedding Closes June Bride Week Campaign

Merchandising Campaign Held in California Under Direction of Cooperative Campaign Meets with Great Success

June Bride Week, in which the electrical industry of California participated for the purpose of emphasizing the fittingness of electrical gifts for the bride, has been characterized as one of the most effective merchandising campaigns ever staged in the West by officials of the California Electrical Cooperative Campaign, under whose auspices the drive was staged.

Not only in the volume of merchandise sold during the week of June 5-10, but also in the publicity secured and the general accrual of good will toward the industry was the campaign successful. Not only did contractor-dealers, jobbers, manufacturers and central stations take an active part in the drive but department stores, furniture stores and hardware stores joined forces with the members of the electrical industry to make the campaign successful.

Many novel features were devised during the week to direct public attention toward the campaign. Radio was effectively used, not only in broadcasting messages from leaders in the industry but also to stage a fitting climax, a radio wedding. During the week prominent men spoke from broadcasting stations in San Francisco, Oakland and Los Angeles daily.

The radio wedding was the chief feature of the week. Through the efforts of John Dignan, special director of the campaign, and W. F. Price, field representative of the Cooperative forces, the event was staged. Over \$200 worth of electrical appliances and radio equipment were donated to the bride and groom whose wedding ceremony was heard by thousands of radio enthusiasts on the coast. The bride was Miss Lillian Kidd of Santa Rosa and the groom, Leland H. Hodgson of the same city. The ceremony was performed at the Rockridge station of the Atlantic Pacific Radio Supply Company by Rev. H. A. Van Winkle of Oakland.

It is interesting to note that the wedding aroused national interest, as the New York Times placed a long distance telephone call from New York in order to obtain the details of the ceremony. The wedding also marked the amalgamation of the radio and electrical interests.

Included in the list of those who donated prizes to the bride and groom are the following:

Landers Frary and Clark, electric tea pot.
Wells Morris Manufacturing Co., waffle iron.
Majestic Electric Development Co., electric heater.
Manning Bowman, electric toaster.
Westinghouse Electric and Mfg. Co., flatiron and curling iron.
Wizard Electric Lamp Co., Wizard lamp.
General Electric Co., all-night lamp.
Edison Electric Appliance Co., coffee urn.
American Electric Heater Co., toaster stove.
Globe Commercial Co., reversible toaster.
Bird Rymer Co. (Oakland), boudoir lamp.
Atlantic Pacific Radio Supply Co., radio equipment.
Leo. J. Meyerberg Co., radio equipment.
Colin B. Kennedy Co., radio phones.
National Carbon Co., radio batteries.
John Breuner Co. (Oakland), dining room furniture.
W. N. Jenkins (Oakland), wedding ring.
Smith Bros. (Oakland), Bride's Wedding Book.

Largely because of the demand from the mining and the citrus fruit industries in the West, the Senate overruled its Finance Committee by an overwhelming vote and placed cyanide on the free list. The fight for free cyanide was led by the Nevada senators.

"The Niagara of Mexico," the name applied to the fall in the State of Jalisco, Mexico, is the site of one of the first large hydroelectric plants in Mexico. The plant has been built to supply power to the city of Guadalajara, 40 miles distant. The equipment, which was furnished by the Westinghouse Electric and Manufacturing Company, consists of one 200-kw. and four 625-kw. rope driven generators.

Books and Bulletins

MECHANICAL STOKERS

By J. G. WORKER, secretary of the Stoker Manufacturers' Association, Member of the American Society of Mechanical Engineers; and P. A. PEEBLES, Member of the American Society of Mechanical Engineers. 6 by 8 in. 258 pages, 109 illustrations. \$3. First edition. McGraw-Hill Book Company, Inc., New York.

Before the appearance of this book there has been little of an impartial nature covering the important field of mechanical stoking equipment. Some space has been given in many of the books on the general subject of boilers, furnaces and power plant equipment to this subject, but there have been no books treating stokers as separate units.

A prospective purchaser of mechanical stoking equipment and the operating engineer who is faced with the urgent necessity of increasing the overall efficiency of his plant have been forced to rely upon manufacturers' information and their own, perhaps meager, experience. These men should welcome the compilation of data and experiences presented in this book.

The authors have included much information on the principles of combustion which are applicable not only to mechanical stoker installations using coal as fuel, but also to any other fuel burning problems. Fifty-seven makes of mechanical stokers are described in the text. It is fully illustrated with halftones and line cuts.

STEAM BOILERS

By TERRELL CROFT, consulting engineer. Member, A. S. M. E., Illuminating Engineering Society, Associate Member, A. I. E. E. 6 by 8 in. 412 pages. 514 diagrams and illustrations. \$4. McGraw-Hill Book Company, Inc., New York.

This book has been primarily compiled for men of little education who desire to acquaint themselves with the subject of steam boilers. To this end, a knowledge of simple arithmetic will enable the student to understand it. All of its statements and the methods and principles which it proposes are both theoretically and practically sound, and it may be used by anyone, regardless of his training or experience, who is seeking a knowledge of steam boilers. Of especial interest are the diagrams, which have been drawn for the purpose of illustrating the theories and examples which are set forth in the text. They have been done so simply that they are readily understandable.

The text deals with the history of steam boilers, modern types, materials and construction, boiler accessories, steam generation, fuels, combustion, and the like. It is very complete in the handling of the subject.

The book should not only prove valuable to the man lower down who is seeking to understand boilers and their construction but also to those engineers whose education did not stress this subject and whose practice demands familiarity with it.

A bill has been passed by the Japanese Diet raising the import duty on copper, brass and bronze.



Window of the John Breuner Company of Oakland, showing the gifts donated to the bride and groom of the radio wedding by members of the electrical industry and others. The wedding marked the climax of the recent June Bride Week merchandising campaign.

Meetings of Interest to Western Men

Leaders of Sugar Industry Hold Convention at Salt Lake

Leaders of the beet sugar industry of the United States, members of the United States Sugar Manufacturers' Association, held their annual convention at Salt Lake City May 29th and 30th.

All beet growing sections of the country were represented. Among those present were W. H. Hannam of the Spreckels Sugar Company of California, W. L. Petrikin of the Great Western Sugar Company of Colorado, S. W. Sinzheimer of the Holly Sugar Company of Colorado, Stephen H. Love of the Utah-Idaho Sugar Company, Harold Pitcairn, Philadelphia; C. D. Bell of the Owasso Sugar Company, Owasso, Mich.; F. R. Hathaway of the Michigan Sugar Company of Detroit, G. W. McCormick of the Menominee River Sugar Company of Menominee, Mich.; H. A. Douglas of the Northern Sugar Company of Minneapolis; W. Harvey Ross of the Gunnison Sugar Company of Utah, Harry A. Austin of Chicago, secretary of the association; E. C. Howe of the American Beet Sugar Company of Colorado; J. Ross Clark of Los Angeles; Judge H. H. Rolapp, president of the association.

The main subjects considered and discussed included the tariff, markets, transportation, methods of beet cultivation and sugar manufacturing.

Among the entertainment features of the convention was a banquet at the Hotel Utah on the evening of May 29, and sight-seeing trips to the various places of interest in and near Salt Lake City.

Members of the association represent 95 per cent of the beet sugar production of the United States, and all of them are hopeful for a renewal of prosperity for the industry, and are looking forward to better prices for their product and for a bigger production of sugar beets in 1923.

While the convention was concerned largely with organization matters, determination was expressed to proceed with the work of the association in promoting the interests of the beet sugar industry in every constructive manner possible.

Stephen H. Love, sales manager and member of the executive committee of the Utah-Idaho Sugar Company, of Salt Lake City, was elected president of the association. Mr. Love succeeds Judge H. H. Rolapp, president and general

manager of the Amalgamated Sugar Company of Ogden.

Three vice-presidents were re-elected as follows: J. Ross Clark of the Los Alamitos Sugar Company of Los Angeles, W. L. Petrikin of the Great Western Sugar Company of Colorado, and W. H. Wallace of the Michigan Sugar Company of Detroit. Harry Austin was re-elected secretary and treasurer of the association, and Truman G. Palmer was retained as statistician.

Electrical People of Salt Lake Get Together at "49" Party

On the evening of May 27th an electrical "49" party was held, under the auspices of the Rocky Mountain Electrical Cooperative League, at Salt Lake City. Nearly 800 people were present, representing all branches of the electrical industry in Salt Lake and nearby towns.

In addition to dancing, one of the main entertainment features was a fully-equipped gambling den, where those who were inclined to do so could flirt with the goddess of fortune via the roulette table, the crap game and various other Monte Carlo activities. "Phony" money exchanged hands in large and small quantities.

Many of the members of the League appeared in "forty-niner" costume, which added greatly to the evening's merriment.

A radio concert was also one of the enjoyable features of the party.

The usual "get-together" spirit, which is being so successfully cultivated by the Rocky Mountain Electrical Cooperative League, was very much in evidence, and it was felt by all concerned that such gatherings are decidedly helpful in accomplishing good results along this line.

Shingle manufacturers of the Pacific Northwest will be the principal beneficiaries of the rail freight reductions recently ordered by the Interstate Commerce Commission. Virtually every industry of this section, outside of agriculture, will receive a direct or indirect benefit by the decreases proposed, but it will be the lumbermen who will profit most substantially. The decision of the commission apparently contemplates that the railroads shall eliminate approximately half of all the freight rate increases they were permitted to make by the commission's sweeping general percentage increase order that became effective Aug. 26, 1920.

Washington Water Power Co. Buys Intermountain Power Company

Stockholders of the Washington Water Power Company, of Spokane, have been notified of the purchase by that company of the Intermountain Power Company, which was organized originally to furnish power to the Chicago, Milwaukee and St. Paul Railway. The Intermountain Power Company is the owner of a 112-mile transmission line from the Washington Water Power Company's Long Lake hydroelectric plant to the railway's sub-station at Taunton, Washington, near the western end of the electrified section of the railroad. The purpose of the purchase, it is stated, is to give greater stability to the Washington Water Power Company. The consideration was not announced.

Picketing in Oregon by Strikers Limited to Silent Patrol

Picketing by strikers in the state of Oregon will henceforth be limited to silent patrol and the wearing of a scarf inscribed with the legend constituting the grievance of the organization employing the picket, according to a decision just handed down by the Oregon Supreme Court in the case of Greenfield vs. Central Labor Council of Portland. The original case in the Multnomah county court arose out of the granting of an injunction against the manner of picketing then employed by the labor council in front of the two mercantile establishments of the plaintiff. The decision just handed down is far-reaching in its effect because it will hereafter prevent pickets from talking with prospective customers or patrons of a business concern affected by a strike, or otherwise using methods of intimidation or boycotting.

65,000-Kva. Units for Niagara Falls Power Company

The Niagara Falls Power Company has placed an order with the General Electric Company for two 65,000-kva., 12,000-volt vertical water wheel generators, the largest ever built, to be used in an extension to their Power House No. 3 at Niagara Falls, N. Y.

These generators will be driven by 70,000-horsepower hydraulic turbines, made by the I. P. Morris Department of the William Cramp and Sons Ship and Engine Building Company, Philadelphia. Each generator will weigh about 700 tons, being 35 ft. in diameter and 26 ft. high. It is interesting to note that the new generators are twice the capacity of the three 32,500-kva. generators now contained in Station No. 3, which at the time of their installation were considered the largest in existence.

All former records for dredging operations on the Willamette and Columbia rivers was broken recently by the dredge Tualatin of the Port of Portland when it handled 35,065 cubic yards of dredged material from the west Swan Island channel and deposited it in the fill being made in the Guilds Lake district for the Northern Pacific Terminal Company. The material was lifted 30 feet and transmitted a distance of 3,300 feet.

COMING EVENTS

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

Annual Convention—Niagara Falls, Ontario—June 26-30, 1922

AMERICAN SOCIETY OF CIVIL ENGINEERS

Annual Convention—Portsmouth, N. H.—June 21-22, 1922

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Annual Convention—Salt Lake City—June 22-24, 1922

J. B. Black, general sales manager of the Great Western Power Company of San Francisco, was chosen president of the Pacific Coast Electrical Association for the coming year at the recent convention of that organization in Los Angeles. Mr. Black served as vice-president of the association during the past twelve months. Graduated from the



J. B. BLACK

University of California in 1912, Mr. Black immediately entered the employ of the Great Western Power Company in the commercial department, rising rapidly from one post to another until his appointment as general sales manager in 1918. Mr. Black is one of the active figures in the electrical industry in the West. He is a member of the advisory committee of the California Electrical Cooperative Campaign and has been instrumental in the success of that organization. His election to the presidency of the Pacific Coast Electrical Association is a recognition of his consistent work in forwarding the ideals of the industry. The coming year is full of promise for the association under his able leadership.

Prof. Duff A. Adams, of Chicago, head of the structural materials bureau of the Lewis Institute, one of the best known concrete authorities in the country, was the guest of Seattle engineering societies recently, addressing meetings of the American Association of Engineers, and the American Society of Civil Engineers, on the subject of "Scientific Methods of Making Concrete."

Prof. Carl Thomas, consulting engineer, has been selected as a member of the City Board of Directors of Pasadena succeeding Joseph Caunt, resigned. Professor Thomas has a wide acquaintance among the engineers of the West, having been very active for many years in educational lines and in engineering practice. For the past year he has been president of the Engineers Club of Pasadena.

George E. Atkins, mechanical engineer, and Paul R. Parker, marine engineer, announce that they have entered into partnership under the name of Atkins and Parker for the general practice of engineering, specializing in mechanical, marine and hydraulic engineering including ventilation and mechanical equipment of buildings and industrial plants. They have established offices in the Hobart building, San Francisco.

Personals

C. A. Fox, superintendent of substations, of the Chicago Milwaukee & St. Paul Railway, was a recent Portland visitor.

L. S. MacIntyre, who has a record of 17 years' rate experience, including four years as traffic manager for the West Coast Lumbermen's Association, and seven years with the Chicago, Milwaukee and St. Paul Railway Company, has been appointed as assistant secretary and director of traffic of the Chamber of Commerce of Seattle.

E. S. Code, electrical engineer with the Westinghouse Electric and Manufacturing Company at Seattle, and Secretary of the Seattle section of the A. I. E. E., has been chosen as delegate to the annual convention of the Institute at Ontario, Canada, during the latter part of June.

George O. Muhlfeld, general manager Stone and Webster Company with headquarters in New York City, recently passed through San Francisco on his return East from a visit to Japan, where his company has extensive hydro-electric developments under way.

Frank D. Fagan, vice-president and general manager of the Edison Storage Battery Company of Orange, N. J., will make an extended tour of the Pacific Coast during the latter part of June. His many friends of earlier days, when Mr. Fagan was connected with the General Electric Company in San Francisco will enjoy the opportunity of renewing acquaintanceship.

Frank W. Smith, vice-president and general manager of the United Electric Light and Power Company of New York City, and newly elected president of the National Electric Light Association, was one of the prominent guests at the recent convention of the Pacific Coast Electrical Association at Los Angeles, as well as one of the speakers on the convention program. He brought a message of confidence and support from the national association to the Pacific Coast organization. The laughing gentleman with Mr. Smith is Herbert Dewes, assistant to the vice-president



and general manager of the Southern Sierras Power Company, general chairman of the convention. Much of the success of the gathering was due to the tireless efforts of Mr. Dewes in directing the many committees charged with staging the affair and entertaining the many guests and delegates.

Col. A. M. Jackson, manager of the Salt Lake City office of the Locke Insulator Corporation, has been appointed chairman of the Rocky Mountain Electrical Exposition Committee. This committee is now actively engaged in the work of directing arrangements for an electrical exposition to be held in Salt Lake City October 2nd to 14th inclusive,



A. M. JACKSON

under the auspices of the Rocky Mountain Electrical Cooperative League. This exposition will be the greatest event of its kind ever held in the West, and already the electrical interests and business institutions in general in the intermountain section are giving the movement their enthusiastic support. A large number of manufacturers throughout the entire country will be exhibitors at the exposition. Mr. Jackson is particularly well equipped to handle the duties of directing this work, due to his experience in the electrical field. For twenty years he was with the General Electric Company at Schenectady, N. Y., in the factory, engineering and commercial departments. Early in 1920 Mr. Jackson accepted a position as sales manager of the Perry-Mann Electric Company of Columbia, S. C. In September, 1921, he was sent to Salt Lake City to establish an office covering the Intermountain and Rocky Mountain territory for the Locke Insulator Corporation of Victor, N. Y. Since then he has been actively identified with the Rocky Mountain Electrical Cooperative League of Salt Lake City. He served over a period of seventeen years in the New York State National Guard, starting in 1901 as a private and completing service in 1919 with the rank of Lieutenant-Colonel. He now holds a commission as Major of Engineers, Officers' Reserve Corps, 104th Division, U. S. Army.

W. F. Wittemore, state highway commissioner of New Jersey, recently spent some time in Seattle. Mr. Wittemore is investigating highway types and highway construction in the West.

H. Foster Bain, director of the United States Bureau of Mines recently passed through Seattle, en route to Alaska for the purpose of investigating the coal fields in the vicinity of Matanuska.

John Horne-Payne, son of R. M. Horne-Payne, chairman of the British Columbia Electric Railway, Ltd., has come to Vancouver from London to join the staff of the British Columbia power company.

W. D'Arcy Ryan, director of the illuminating engineering laboratory of the General Electric Company, known in the West as the designer of the illuminating scheme for the Panama-Pacific Exposition in 1915, is again in the West on a tour in connection with engineering investigations of lighting problems in some of the most important cities.



W. D'ARCY RYAN

He will also have charge of the elaborate illumination system which is being devised for the Electrical Exposition which will be held in Salt Lake City during the coming fall. Mr. Ryan states that one of the greatest problems which now confronts the cosmopolitan districts of this country, is the proper application of highway lighting to the boulevards and country traffic lanes where the night accident hazard has assumed such gigantic proportions. He expressed considerable satisfaction with the interest which the West has shown in this problem and the steps already taken in many localities to save both life and property through proper electric lighting.

R. S. Masson, vice-president of the Pacific Gas and Electric Company of Arizona, represented Arizona at the recent convention of the Pacific Coast Electrical Association at Los Angeles.

Howard F. Beebe, president of the Investment Bankers' Association of America, and official of the Harris Forbes Company of New York, was one of the chief speakers before the industrial conference of the Pacific Coast Electrical Association. Before returning to the East, Mr. Beebe visited San Francisco and other business centers investigating the market for power company securities.

Major Louis D. Blauvelt, Colorado state highway engineer has been appointed chief construction engineer for the Moffat tunnel, which will open a new line of communication through the Rocky Mountains between Colorado and Utah. Major Blauvelt was formerly chief construction engineer for the Moffat Railroad.

W. D. Shannon, who was construction superintendent on the Great Western Power Company's Caribou project for Stone & Webster, Inc., has gone to Seattle for that firm to take charge of the construction of a transmission line to be built from Puget Sound to the Columbia River for the Puget Sound Light and Power Company. The work will extend over a period of a year.

Dr. Thomas Addison, Pacific Coast manager of the General Electric Company, gave the members of the San Francisco Electrical Development League some interesting impressions of his recent trip around the world when he spoke before them recently.

W. H. Onken, editor of Electrical World, was one of the guests at the recent Los Angeles convention of the Pacific Coast Electrical Association. Mr. Onken was a member of the party which included F. W. Smith, president-elect of the National Electric Light Association and M. H. Aylesworth, executive manager of the Association. The party also attended the convention of the Northwest Electric Light and Power Association at Boise.

Arthur Halloran, editor of "Radio," and Max Lowenthal, president of the Pacific Radio Trades Association, gave a program before the Oakland Electric Club recently designed to show the possibilities of radio. Merchandising of radio equipment was the theme of Mr. Halloran's address.

C. R. Aldrich, prominent Seattle contractor, has been elected president of the Associated Industries of Seattle for the coming year.

Clare N. Stannard, vice-president and general manager and V. L. Board, assistant general manager of the Denver Gas and Electric Light Company headed the group of Intermountain central station executives which attended the recent annual convention of the National Electric Light Association at Atlantic City. Others from Denver who attended the convention were W. F. Brown and J. F. Greenawalt of the Mountain States Telephone Company and E. A. West of the Denver Tramway Company.

W. C. Smith of the transformer department of the General Electric Company in San Francisco, is on a six weeks tour of eastern business centers. While in the East Mr. Smith will attend the annual meeting of the American Institute of Electrical Engineers at Ontario, Canada.

W. L. "Jack" Frost, assistant to the general manager of the Southern California Edison Company, won the Byllesby cup in the annual golf tournament at the Los Angeles Convention of the Pacific Coast Electrical Association. "Jack" played a high class game and



registered both low net and low gross score so there was no question as to his prowess. The brilliant light from the cup so dazzled him that he was forced to shut his eyes when he took the cup from the hands of G. B. Kirker, sales engineer of the Westinghouse Electric and Manufacturing Company.

J. R. Barry, secretary-treasurer of the recently organized Seattle Electrical Association, received his education and early training in the electrical industry in Chicago. Early in 1913 he came West, locating in Vancouver, B. C., where he accepted a position as superintendent of construction for the Pacific Fire Extinguisher Company. In 1916



J. R. BARRY

Mr. Barry came to Seattle where he became identified with the C. H. E. Williams Company, electrical contractors. From 1916 until 1919, he was manager of the Seattle office of this concern. Early in 1920 he organized the Atlas Electric Company, of which he is the active head. Mr. Barry is one of the original founders and most enthusiastic promoters of the Seattle Electrical Association, which numbers among its membership practically every man in the electrical industry in Seattle.

C. A. Semrad and F. S. Henderson of the Western Light and Power Company of Boulder, Colo., W. C. Sterne of the Arapahoe County Light and Power Company, and E. A. Phinney of the Jefferson County Light and Power Company, both officials of the Rocky Mountain division of the National Electric Light Association, were among the northern Colorado central station men who aided in the display of the Denver Home Electric.

H. W. Turner, contractor-dealer of Butte, Montana, is a recent San Francisco visitor. Mr. Turner states that business conditions in Montana are greatly improved owing to the resumption of mining operations.

J. Johnson, supervising engineer for the Blue Funnel Steamship Company, a British shipping firm, is a recent San Francisco visitor. Mr. Johnson thoroughly investigated shipping and ship-building facilities and practices around San Francisco Bay before departing to the Orient.

W. J. Laufenburg, formerly in charge of city sales for the Denver office of the Western Electric Company, has been made lighting expert attached to that office and serving the Intermountain territory adjacent to that city. His place has been taken by Paul A. Douden, formerly farm power plant expert. Other changes in the Denver office include the appointment of John A. Baker as sales manager for line materials and the transfer of Harry Fritz to the Chicago office of the company.

The Westinghouse Electric and Manufacturing Company, East Pittsburgh, has developed a new type of direct current electrolytic lightning arresters, specially designed for car or station use on railway, power and lighting circuits. The arresters are for voltage applications up to 3,800, and contain from one to 12 cells. They are capable of passing a surge current of approximately 1,000 amperes at double normal voltage.

The General Electric Company has recently placed on the market a small portable stand carrying an electric motor and a variety of pulleys for general use on the farm. The entire device weighs approximately 60 pounds and is so designed that any type of small farm machine can be belted to it. The motor is rated at $\frac{1}{4}$ hp., maximum speed 1140 r.p.m., and may be obtained in voltages ranging from 32 to 220 volts d.c. and 110 to 220 volts a.c.

The Monitor Controller Company, Baltimore, has recently developed a thermal-limit starter which will allow an induction motor to exert six or seven times its normal power for a limited period and at the same time protect it from a prolonged overload as small as 25 per cent. At the same time the device automatically takes care of temperature changes so as to protect the motor under all conditions of operation. The "Thermaload Starter," as the device has been named, consists of a standard Monitor type three-pole magnetic contactor and a thermal-limit relay of a new type. It may be obtained in various ratings and sizes.

The Ajax Electric Specialty Company, St. Louis, has placed on the market a line of radio apparatus parts to be sold to the jobber and the manufacturer of complete apparatus. The line is being added to from time to time and a catalog and price sheet will be issued shortly.

The Worthington Pump and Machinery Corporation, New York, has issued bulletin No. BK-1851-A, describing the new Worthington Diesel engine. The engine is of the two-cycle, solid injection type, and comes equipped with a standard pulley for general service or direct connected for 60-cycle electric service. The engine may be obtained in sizes ranging from 30 to 450 hp.

The National X-Ray Reflector Company, Chicago, has announced the appointment of three additional resident engineers in the various societies where it has studios. The appointments include George P. Pritchett at Philadelphia, Robert P. Burrows at Cleveland and John S. Gullledge at St. Louis.

The National Metal Moulding Company, Pittsburgh, has just issued a new catalog describing Liberty rubber covered wire, cable and cord. In addition to giving specifications to which wires and cables are made, a table is included which gives in condensed form all of the data which users of such material need from time to time. The information in the catalog is a distinct contribution to the industry.

The Hazard Manufacturing Company, Wilkesbarre, Pa., has recently issued an attractive booklet describing the various qualities of Hazard "Keystone" wire. The publication describes the construction of the wire from the standpoint of its insulation.

Manufacturer, Dealer, and Jobber Activities

The International General Electric Company has announced that the Paris-Orleans Railway, one of the six great systems of France has recently placed an order for \$8,000,000 in electric locomotives with a group of French manufacturers headed by the Compagnie Francaise Thomson-Houston, representatives for the American firm in that country. The French road has adopted a program of electrification based on the 1500-volt direct current system.

The Baker-Joslyn Company, Pacific Coast jobbers, recently announced the purchase of a block of property at Second and Bryant streets, San Francisco, where it will erect a modern warehouse and office building. It is expected that approximately \$100,000 will be invested in the property and building.

The Maintenance Company, Inc., electricians and elevator engineers, New York, has placed on the market a new and improved measuring wheel known as the "Electro." It is designed as a labor saving device for telephone, light and power companies and civil engineers for measuring and laying out pole lines, man hole locations and underground systems. It is claimed that one man using the wheel can do the work of two with a tape in much less time.

The Fibre Conduit Company, Orangeburg, New York, has acquired the plant of the American Fibre Conduit Corporation at Fulton, New York, and the conduit manufacturing business of the Johns-Manville Company at Lockport, New York, and has appointed Johns-Manville, Inc., as sales agent for its products, effective as of May 15, 1922.

The Western Electric Company is beginning the distribution of literature covering the No. 10-A Loud Speaking Telephone. This complete device is a 2-step vacuum tube amplifier with 3 vacuum tubes and a moulded fibre horn on a balanced armature type receiver. This is the first time that Western Electric engineers have placed a loud speaking device on the market although the trade has known for some time through the press of their successful development.

The Maxim Silencer Company, Hartford, Conn., has recently perfected a silencer for oil engine exhausts which promises to have a wide field of application on Diesel engines and two-cycle cylinder oil engines. It is claimed that the silencer also improves the running of the engine by equalizing the back pressure and disposing of practically all of the exhaust gases.

The Wagner Electric Manufacturing Company, St. Louis, Mo., announces the removal of its Salt Lake City office to 313 Dooly Building.

Harry B. Kirkland, vice-president of the American Wiremold Company, formerly in charge of the district sales offices of the company in New York City, has moved to the home offices of the company at Hartford where he will have direct charge of the sales department.

The Estate Stove Company, Hamilton, Ohio, has recently added two new types of electric range to its standard line. Range No. 84-E is of the four heating plate type with a spacious oven and a separate broiling compartment. It has a maximum watt demand of 7,750 with a probable average of 3,500. Type No. 78, the Kitchenette range, is designed for use in apartments, homes with small kitchens and cottages. It is of the two plate type and has a large oven. It is equipped with either a master or a distribution switch. In the latter case special wiring from the house to pole is unnecessary as the maximum demand is but 1,750 watts.

Ray W. Turnbull, Northwest representative of the Edison Electric Appliance Company, is directing an intensive range sales campaign in Seattle, Tacoma, Spokane and Portland, emphasizing the new Hotpoint Hughes Super-automatic range. In each of the cities, the campaigns have been inaugurated with dinners to which dealers, jobbers and central station representatives have been invited.

The Majestic Electric Development Company, San Francisco, announces the addition to its sales staff of Arthur Kempston and T. M. Stateler.



THE WILD AND WOOLLY WEST

Boots, high hat, star and last but not least, whiskers. This is not "The Sheriff" or any such frontier character. It is J. C. Hobrecht, Sacramento contractor-dealer, owner of the J. C. Hobrecht Company, togged out in a costume befitting the recent Days of '49 celebration in the California city. Mr. Hobrecht is but one of the many members of the electrical industry who played an active part in the highly successful affair. But to comment on the hat, which appears both irrelevant and immaterial. Our highly efficient staff photographer attempted to include hat, boots and star in the picture but missed out on the "beaver." But our obliging staff artist came to the rescue and supplied the missing headpiece.

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SAN FRANCISCO

Favorable reports from basic industries continue. Manufacturing shows expansion, and there are numerous new shops and assembling plants of Eastern concerns whose business has been increasing in this territory. A strong demand for lumber aided the financing of several properties and the re-opening of a number of sawmills, and a large cut of timber is indicated. Prices are steady to higher. There is more export business. Aside from damage to grain crops from hot winds, prospects are favorable.

Retail buying is somewhat belated, and there will be some carryover of merchandise from Spring to Fall. Summer goods, however, are moving more freely.

There is a decided shortage of steel in this section, mills being unable to fill orders. Local railroads have been heavy purchasers and the increased building operations are depleting the stocks.

SEATTLE

A distinct betterment of business conditions, and revival of confidence on the part of business men and industrial operators in the Puget Sound district is noted during the past month. The increased purchasing power of the district in and around Seattle, due to improvement of the unemployment situation, and unusually splendid conditions in the lumber industry, have gone far to restore to the business men of the community a feeling of optimism and faith in the immediate business future.

Assurance of crops throughout the state considerably in excess of the bumper ones of last year, combined with freight reductions, and very important modifications in federal crop gradings, lend new hope and confidence to the farmers, and to the districts directly benefiting.

Another encouraging feature of the Northwest situation is the revival of commerce with Alaska, with that section buying much more heavily than for the past two years. During April, Seattle shipped 67 per cent more tonnage to Alaska than for the same month last year.

Lumber production in Northwest mills continues to exceed normal, with splendid demand for lumber products.

SALT LAKE CITY

The steady improvement in business conditions continues throughout the intermountain section, with every indication that this improvement will become more marked each day from now on.

Building activities are getting under way, particularly in Salt Lake City and

the other large towns. Irrigation projects are being developed in many of the agricultural districts, which means increased activity for the farmers, and also is providing a market for the sale of electric motors and other apparatus.

Wool money is coming in, and prices for wool are satisfactory, ranging from 30 to 40 cents per pound.

With the prospect of lower freight rates on ore shipments from the mines to the smelters, mining operators are very optimistic and several properties are enlarging their output. About 1,400 men are now employed in the various departments of the Utah Copper Company, and the company's Arthur plant at Garfield, Utah, is operating at normal capacity. Work is also well under way at the Nevada copper properties.

The local hardware trade reports business steadily improving. This is also true of the lumber trade.

A large road-building program in Utah and Idaho is now under way, which will result in considerable money being spent in this section and work provided for many men.

PORTLAND

An optimistic feeling prevails in all lines of business. Wholesale and retail trade are good and industry continues to pick up. Lumber production continues to increase. For the week ending May 27 production was 12 per cent above normal while new business was 10 per cent above production and shipments 8 per cent below new business. Unsettled freight rates from the Pacific Coast to the Orient and a slump in the lumber market in China and Japan have materially reduced exports from this port during May. Coastal and inter-coastal trade, however, is not materially changed. Building permits for May exceeded those for May, 1921, by 11 per cent in number and by 100 per cent in valuation. The value of residence permits exceeded those of last year by 37 per cent. There were 42 per cent more electrical permits issued this year than last year and the valuation was 40 per cent greater. Fees from electrical permits for May were the greatest in the history of the department. With this situation it is only natural to find wiring and fixture business very active with the electrical contractor-dealers. Jobbers report business slightly improved.

LOS ANGELES

Building permits for May ran 50 per cent ahead of May, 1921, in numbers and 25 per cent greater in values estimated. This is due to the unprecedented activity in residence construction—totals for May, 1922, being \$9,327,504 for all classes, with 4,024 permits issued during the month. Bank clearings finished the month with an

average weekly amount in excess of 30 per cent ahead of same periods last year. The clearings for the month were \$438,772,763, which compares with May, 1921, as an increase of 30 per cent over the former year of \$323,552,713.

In spite of decreased valuations on all shipments through the local harbor the business is running more than 100 per cent in excess of 1921 in point of values and 125 per cent in quantity of exports and imports.

Commodities that enter into building cost are slightly under the 1921 prices but not sufficiently so to encourage any withholding of construction until later dates. Labor is plentiful and considerably cheaper in all common grades with skilled mechanics still commanding about the same wages.

Much local encouragement is felt in the recent freight reductions which will be reflected in many of the basic industries of this section to a great extent. Fruit crops and produce are in excellent condition and only about ten days behind average yearly dates for marketable condition.

Large purchases of electrical machinery by central stations continue to hold the manufacturers' attention. Small appliance sales continue only fair. Special campaign efforts during June are expected to bring large results.

DENVER

Denver and contiguous territory is making rapid strides towards prosperity, according to reports from banking interests and commercial organizations. For the first time since 1919 bank debits have increased showing that merchants and manufacturers are again borrowing to finance increasing business.

Coal production in this territory under strike conditions is about 20 per cent of full capacity with slight demand for domestic purposes. Zinc and lead mining is on the boom and reports from some of the main centers indicate increased activity in metal mining.

The unemployment situation has been greatly relieved through new construction and farm work.

Building permits in this city for May totaled nearly three million dollars, the second highest figure in the history of the city. Building materials such as brick, lumber, etc., have increased in price and certain building crafts, especially bricklayers and plasterers, because of their shortage in numbers, are being paid a bonus.

The showing of the electrical home in this city has stimulated interest in matters electrical, which is being reflected in quite a number of improved wiring jobs and in the sale of some appliances. However, it is believed that a more lasting effect in this line will materialize during the next few months.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and
All Business Men Opportunities for New Business

Bridges

Ore., The Dalles—The Dalles-Oregon-Washington Toll Bridge Company has selected a steel and concrete type of bridge to be erected across the Columbia River three miles above The Dalles. All but three of the spans will be of concrete; the longest span, of steel, will cover the main channel, a distance of 267 ft. Estimated cost is \$356,350.

Wash., Everett—H. B. Sewall, manager of the Pacific Northwest Traction Company, recently announced that \$250,000 will be spent next year in replacing several bridges and 4.5 miles of trestle decking on the Interurban lines between Bellingham and Mount Vernon.

Wash., Raymond—Contract for the 225-ft. steel swing draw bridge across the Willapa River has been let to the Penn Bridge Company of Beaver Falls, Pa., by the state highway board at Olympia, price \$148,000.

Buildings (Industrial)

Cal., Pittsburg—Plans are being completed and a contract will be awarded within the next two weeks for a business block to be erected at Railroad and Fifth streets by W. J. Buchanan to be occupied by Buchanan's Telephone and Telegraph Company, which will install a modern dry battery switchboard for the local telephone system. The new structure will be of brick. Architect A. W. Cornelius is preparing the plans and the building will represent an investment of \$50,000.

Cal., Long Beach—The Long Beach Paper Box Company will erect a one-story factory building in the 2000 block on Cherry Ave., estimated cost, \$100,000.

Cal., San Francisco—T. W. Corder, representing an eastern cutlery company, has purchased property at Howard and Tenth Streets and will erect a \$65,000 factory on the site.

Cal., Lodi—The J. H. Peppers Company has started the construction of a new packing shed at the corner of Main and Oak Streets, to cost \$45,000.

Cal., Glendale—The International Chemical Products Company will erect a plant on Colorado St. for the manufacture of printing inks. The first unit will be 2-story, 25 by 100 ft. George W. Strang is manager.

Cal., San Bernardino—Chas. A. Fellows has the contract to build the new machine shop for the Atchison, Topeka and Santa Fe Ry. The structure is to be of concrete with steel roof trusses. Cost said to be \$107,000. Plans supervised by railway offices in Los Angeles.

Cal., San Francisco—Baker-Joslyn Company, wholesale dealers in electrical supplies, has purchased the property on the northwest corner at Second and Bryant, where the erection of a modern building is contemplated.

Cal., Atascadero—The Doble Steam Motors Corporation will move its plant from San Francisco to Atascadero where a large concrete plant will be erected.

Colo., Rollinsville—Chicago capital has been secured for the construction of a paper mill here to cost a half million dollars. Timber leases have been obtained and engineers are now working on the details of transportation and plant construction.

Ore., Portland—After making a careful survey of conditions in the Northwest, the Oregon Washington Glass Company has decided on

Portland as the location for its plant. The company will incorporate with a capital stock of \$500,000. Work on the factory will begin as soon as the proposition is financed.

Wash., Raymond—The Columbia Wood Products Company, according to announcement will erect a large veneer plant here on the site of the State Lumber and Box Company.

Dams

Cal., Hemet—Lake Hemet Water Company has filed petition with the state water board for water appropriations on Strawberry Creek and contemplated the development of 5,000 h.p. by a dam and diversion canal. The pipe line and canal will be approximately one mile in length.

Cal., San Diego—The city manager has submitted his recommendation to the city council, calling for improvements to the Switzer Canyon dam. It is proposed to raise the dam 20 ft. to impound an increased supply of water. The cost is estimated at \$20,000.

Buildings (Miscellaneous)

Ariz., Mesa—Church—The Latter Day Saints Temple will cost \$500,000, according to the contracts started under the direction of Young and Hansen, architects, of Salt Lake City. Local building committee is headed by J. T. Lesueur.

Ariz., Phoenix—Hotel—Fitzhugh and Byron, architects, announce that they have been instructed by H. L. Bird to supervise the completion of two additional stories on the Third and Washington hotel property. It is estimated that \$80,000 will put the hotel in completed condition.

Ariz., Tucson—School—Lyman and Place are the architects for the new group of high school and manual training buildings. The equipment of the mechanical department will be especially complete. Estimated cost of the entire program is placed at \$750,000.

Ariz., Yuma—Sugar Mill—According to statements of Dr. F. Thatcher, president, the Yuma Valley Cane Sugar Corporation will erect a refining plant and sugar mill in this city. Necessary financing is said to be available.

Cal., Los Angeles—Theater—F. E. Keeler and C. H. Thompson will build a modern theater at the corner of Hollywood Boulevard and Yucca St., at a cost of \$300,000 and will lease the structure to Oliver Morosco. Architectural supervision under B. O. McCormick. Building will be class "A" of reinforced concrete, steel trusses and brick facing.

Cal., San Pedro—Hotel—Architect William F. Bowen of Los Angeles is preparing plans for a 3-story and basement, class "A" hotel building of reinforced concrete to cost approximately \$175,000. Power plant includes laundry and heating system as light and power service will be purchased.

Cal., San Bernardino—Hotel—C. B. Phillips has commissioned architect Howard E. Jones of this city to prepare plans for a 5-story commercial hotel to be erected on E. Street near 3rd. at an estimated cost of \$200,000.

Cal., Los Angeles—Creamery—The Hanson Dairy Co. is planning the erecting of a reinforced concrete dairy plant on the northwest corner of Wall and 11th Streets, to cost approximately \$100,000. Plans are being prepared by Clifford A. Truesdell, Jr., Architect.

Cal., Pomona—Theater—The West Coast Theater, Inc., will erect a three-story, \$180,000 theater at the rear of the present Pomona Investment Building on Third Street.

Cal., Los Angeles—Theater and Store—A brick theater and store building to cost \$50,000 will be erected at Sunset Boulevard between Rodney Drive and Vermont for Nick Lazarevich, 4628 Hollywood Boulevard. F. A. Noyes, Jr., and Gordon LaBarr, architect and engineer.

Cal., Long Beach—Theater—Plans and specifications have been drawn for the new Compton Opera House which will be under construction within the next few weeks, to cost about \$50,000. Plans and specifications call for a building 150 ft. long, seating capacity, 900, 2 stories high.

Cal., San Diego—Barracks—The contract for the Naval Training Station barracks to be erected at Point Loma was awarded to Lange and Bergstrom for the sum of \$487,000. Buildings are to be of concrete and tile.

Cal., Long Beach—Bank and Office—Architect John Parkinson and Donald Parkinson are preparing plans for the new bank and office building to be erected at the Southeast corner of 4th and Pine Sts., for the First National Bank of Long Beach. The structure will be part 3-story, steel frame, marble and tile walls and elegantly appointed, costing approximately \$250,000.

Cal., Glendale—Church—Nance Construction Co., has been awarded a contract for the erection of the Congregational Church, at Wilson and Central Avenues, price, \$65,000. C. H. Winslow is the architect.

Cal., Los Angeles—Church—The First Methodist Church is planning the erection of a \$125,000 church, with a seating capacity of 1,200.

Cal., Downey—Church—Steed and Steed have been awarded the contract for erection of the new Methodist Church, to cost \$20,000.

Cal., Turlock—Packing House—A. H. Connelly, engineer for E. L. Foley, is here to superintend the erection of a green fruit packing house to be 48 x 220 ft. in size.

Cal., Richgrove—Packing House—The newly organized Richgrove Jasmine Citrus Association is planning the erection of a three-car capacity house for the 1922 naval orange season at a cost of approximately \$30,000. Carl Young is manager of the Richgrove Jasmine Company.

Cal., Sebastopol—Packing House—At a recent meeting of the Sebastopol Apple Growers' Union it was decided to erect a new packing house at Trenton, to be 80 x 120 ft. in size. Additions to the Melino and Healdsburg packing houses were also decided upon.

Cal., Los Angeles—Hotel—The Salvation Army will erect a hotel to be used exclusively for ladies. The building will cost \$175,000, according to estimates made by architect A. S. Heine-man, and will contain 135 rooms.

Cal., Pasadena—Office and Store—Contract for a block of office and store buildings has been awarded to Wopschall Bros. at a price of \$58,000. F. C. Mattison is the owner and the property is located at 559-71 S. Lake St. L. C. Brockway is architect.

Cal., Glendale—Church—Glendale Presbyterian Church has undertaken the construction of a new edifice at an expense of \$150,000. Robert Orr is architect for the building which is to be at the corner of Howard and Louise Sts.

Cal., Glendale—Club House—Architect Alfred F. Preist is supervising the erection of a club house and auditorium at 400 No. Central for the Tuesday Afternoon Club of Glendale. \$65,000 will be expended for the building, exclusive of furniture and fixtures.

Cal., Long Beach—Railway Depot—A freight and passenger depot will be erected at the intersection of Anaheim Ave. and American Ave. by the Pacific Electric Railway Co., according to the announcement of the engineering department. Plans are being prepared in the Los Angeles office of the company.

Cal., El Centro—Bond Election—The county board of supervisors has decided to call a bond election for the proposed new court house which is estimated to cost \$350,000. Final plans are being prepared.

Cal., San Diego—Theater—Lange and Bergstrom are the contractors for the new Pantages theater and office building to be constructed by Robinson and Blankenship at a cost of \$1,250,000. The structure will be 7-story and it is to be provided with an extensive cooling system.

Cal., Los Angeles—Office—Myron Hunt is the architect for a 6-story office and loft building to be erected at the corner of Pico and Main Sts. for occupancy by F. W. Braun Company. Macdonald and Kahn are the contractors at a contract price of \$450,000.

Cal., Los Angeles—Warehouse—E. H. Flaherty, engineer, is in charge of warehouse construction for Latham Transfer and Storage Company of Santa Barbara. A 4-story reinforced concrete building is now ready for bids.

Cal., Long Beach—Bank and Office—Following the agreement on height of buildings in business district the 12-story office and bank structure planned for Edward John by architect W. Horace Austin has been contracted for at a price approximating \$850,000. Convenience outlet wiring, vacuum and refrigerating systems are part of the equipment which will make this building the most complete as well as the largest one in the city. J. D. Shearer is the general contractor.

Cal., Los Angeles—Office—\$750,000 will be spent on the Examiner Building by W. R. Hearst. According to architect Julian Morgan the plans call for steel frame, concrete and tile work in two wings.

Cal., Fresno—Office and Store—Estimated cost of the 8-story office and store building for T. W. Patterson is \$600,000, according to a contract awarded to R. F. Felchin Company of this city. Heating and cooling systems, compressed air piping, ice-water plant and three high speed elevators are included in the specifications.

Cal., Fresno—Theater and Office—\$480,000 will be expended by Emil Kehrlein and associates in a fire-proof theater and office building on the property recently acquired at the corner of J St. and Stanislaus Avenue. Theater to seat 2,500 people and to have full stage equipment of the latest design.

Colo., Denver—Warehouse—The American Steel and Wire Company has announced plans for a \$500,000 warehouse in this city which will occupy a city block close to the location of the present warehouse.

Colo., Denver—Creamery—A million-dollar merger of the Producers Dairy, the Climax Ice Cream Company and the Corbett Dairy Company has resulted in the development of plans for a centrally located creamery and dairy plant at an estimated cost of \$300,000.

Colo., Denver—Apartment Hotel—A twelve-story apartment hotel in the residence district to cost \$800,000 and which will be completely electrified has been planned by the Denver Mortgage and Realty Co.

Highways

Cal., Ontario—The auto road to Camp Baldy, until recently a toll road but now under the supervision of the county supervisors will be

improved from the entrance to San Antonio canyon to Hogsback grade, a distance of several miles. The cost is estimated at \$30,000 and it is expected that two years will be required to complete the work.

Cal., Sacramento—The Federal Construction Company was low bidder on the 11 miles of Kern Co. highway officially known as Sections 29 and 30. The bid was \$59,466 or 20 per cent less than the engineers' estimates.

Idaho, Boise—Plans are being prepared for road work in Idaho involving an expenditure of over one million dollars by the federal government, according to J. P. Martin, district engineer of district four of the forest service, who recently received approval from Washington of the following road projects: The North Fork-Payette project between Horseshoe Bend and Banks, a distance of 15 miles, at a cost of \$125,000; the Salmon-Montana project from Salmon City to the state line, a distance of 20 miles, at a cost of \$140,300; the DuBois-Monida, from DuBois to the Idaho-Montana state line, a distance of 17 miles, at a cost of \$104,000; the building of one and one-half miles of the north-south highway between Glendale and Tamarack, at a cost of \$25,000, and the repairing of six and two-tenths miles at a cost of \$6000; the Warm River-Yellowstone project between Warm River and the Montana state line, a distance of 26 miles, at a cost of \$61,000; the Warren wagon road between McCall and Warren, a distance of 18 miles, at a cost of \$75,000, and the Ketchum-Clayton project, a distance of three miles, between Ketchum and Galena, at a cost of \$8300.

Idaho, Boise—Contract for the construction of about 21 miles of highway in Adams County has been awarded to the Morrison-Knudsen Construction Company of Boise, at a cost of \$134,972.68. Work is to be completed before Dec. 1. The stretch of highway lies between Tamarack and Round Valley. D. F. Murphy & Co., of Boise, were low bidders for ten miles of highway between Whitebird and Lucile.

Nev., Carson City—Humboldt County has awarded the contract for the road between Valmy and the east county line to Kroft and Bundy of Ogden, Utah, at a cost of \$45,717 for the total of more than 10 miles. No announcement has been made regarding the 20 miles in Elko County on which bids were received in May.

Utah, Richfield—A special bond election on May 20 resulted in the passing of the \$250,000 Sevier county road bond issue. Work on hard-surfaced roads will begin at Richfield and Salina some time in July.

Irrigation Projects

Cal., Sacramento—The American River Water and Power Co. contemplates the building of a dam and hydroelectric plant at Auburn which will utilize the middle and north forks of the American and Rubicon rivers. According to the estimates of engineers Ellery, Frost and Patten, 200,000 hp. might be developed and 200,000 acres of land provided with irrigation water by the project. Estimates of total cost run as high as \$18,000,000.

Cal., Cucamonga—G. P. McGorkle and associates have petitioned the state water board for permission to appropriate 12,000 acre ft. from the flood water flow of Big Rock Creek by building a dam in Los Angeles County. It is proposed to irrigate 30,000 acres.

Cal., Hemet—At a meeting of the ranchers and property owners it was decided to continue investigations further before starting the development of the waters of the San Jacinto Mountains in connection with the proposed irrigation project. Engineer Frank Gillelan of the firm Olmstead and Gillelan, Los Angeles, is assisting in the preliminary work.

Cal., Placerville—Contract for construction of the El Dorado Water Corporation's Webber Creek project, consisting of an irrigation system and dam supplying the Bartlett district, has been awarded to E. W. Hesse, of San Francisco.

Cal., Santa Barbara—Carpinteria Valley as far north as Sheffield Drive will be furnished water for irrigation of groves and orchards—plan is to sink two artesian wells on 135 acres already optioned—water to be pumped into pipe line to run along highway to Rincon Creek region, at this point to be located main pumping station—according to engineer's estimate cost of water project \$743,527.

Ore., Klamath Falls—Approximately \$387,000 will be expended in constructing a diversion dam, canals and irrigation work to carry water to 10,000 acres, the first unit of a project which will ultimately embrace 30,000 acres, in the Langell Valley in the vicinity of Klamath Falls. Work will begin at once.

Power Plant Equipment

Wash., Tacoma—The municipal lighting department is calling for bids on equipment needed for the auxiliary steam plant to be constructed on Dock Street, to be installed not later than September 15. The equipment includes two turbo generator units, two exciter-generator units, two condensers, pumps, etc., boilers and furnaces, miscellaneous electrical equipment and boiler-room auxiliaries. This equipment is to be used in connection with that of the Consumers' Central Heating Company, to generate a maximum of 9,000 kw., to fill in the city's fall peak demand deficiencies.

Power Projects

Cal., Escondido—Lester A. Wright, district manager of the San Diego Gas and Electric Company, announces that his company is arranging to furnish power to be used in building the great Warner dam. Building of the high power line will begin at once.

Ore., Cottage Grove—The pole line of the California-Oregon Power Company between here and Springfield is nearing completion and the Mountain States Power Company which supplies light and power to this city will begin immediately the construction of a line on these poles to transmit energy from Springfield back to Cottage Grove. It is expected that the main line of the California-Oregon Power Company between Springfield and Prospect in the Southern part of the state will be completed by June 1.

Ore., Eugene—The city of Eugene has applied to the state engineer for permission to appropriate 400 sec. ft. of water from McKenzie river for developing power and light for general purposes. The estimated cost of the work is \$120,000. Permit has been granted.

Utah, Duchesne—The Utah Power & Light Company is preparing to extend its line from Lakefork to Duchesne, a distance of 14 miles. The new line will serve several large ranches in this section of the Utah basin.

Wash., Spokane—The Washington Water Power Company has announced that it will construct 100 miles of new power lines and rebuild other lines in the Palouse country during the coming summer. The program includes 60 miles of 110,000-volt line from Lind to Colfax and 40 miles of 60,000-volt line from Colfax to Pullman.

Wash., Seattle—The Board of Public Works recently awarded contracts to the following concerns for materials to be used at the Gorge Creek plant of the Skagit River power development project. Steel penstocks for Gorge Creek power house to the Puget Sound Machinery Depot, Seattle, for \$59,470; 150-ton electric crane for Gorge Creek power house to Manning-Maxwell & Moore, Inc., for \$22,000; 10,000 Emily Pierce knobs to Western Electric Company, for \$930.

Railways

Ariz., Globe—Actual construction has commenced on the grading and concrete culvert work for the railroad extension from Inspiration to the Porphry property of the Inspiration Consolidated Copper Company.

Cal., Los Angeles—\$29,000,000 is being spent in Los Angeles and near there, by the Union Pacific Railway Co., including the erection of shops and purchase of sites at Hobart St., on the East Side; new freight terminal to be erected at Alameda St., between 8th and 9th Sts., costing over \$1,000,000; also new line from Whittier to Santa Ana.

Cal., Bakersfield—The Atchison, Topeka and Santa Fe Railway, through P. W. Doane, announces that the company will spend approximately \$400,000 within the next two years in erecting new machine shops and installing equipment with which to build cars and heavy engine repair work. A tract of 20 acres was recently purchased here.

Idaho, Boise—Plans for the improvements of its lines in Idaho have recently been announced by the Oregon Short Line, through H. M. Adams, vice-president of the Union Pacific System. Work will start at an early date. The company is to expend \$465,000 at Pocatello; at Nampa the siding facilities to handle perishable crops will be enlarged by the expenditure of \$185,000, which will provide for 23,000 additional foot of yard trackage. At Payette the tracks for direct loading will be increased by 2,800 feet and at Fruitland additional tracks and a depot will be constructed to cost \$25,000. A 150-ton track scales will be installed at Idaho Falls and at Soda Springs a new stock landing track will be put in.

Wash., Bellingham—Replacements that will cost about \$250,000 will be undertaken on the interurban next year according to Harry B. Sewall, manager of the Pacific Northwest Traction Co. The company will replace about one-half mile of rails in Elk St., in the near future at an estimated cost of \$30,000. On the interurban the high bridge at the fork of the Samish Lake and the Chuckanut highways will have to be entirely replaced, also the Blayton Bay bridge, which crosses the Great Northern tracks, and all the decking of four and one-half miles of trestles along the waterfront south of the bay.

Wash., Everett—Improvements on the Cascade Division of the Great Northern Railway lines, costing \$500,000, have been announced. The work includes moving freight terminals from Gold Bar to Skykomish, replacing the wooden draw span over the Snohomish River with a steel span, and a new bridge over the Miller River.

Street Lighting Systems

Cal., Fullerton—Ornamental Lighting—C. W. Sparks of Los Angeles was low bidder at \$26,412 for the installation of 156 concrete posts and Novolux lighting units. Work will commence at once on this contract.

Cal., Pasadena—Ornamental Lighting—Contract for underground conduits on El Molino and adjoining streets was awarded to the Southern California Electric Company of Los Angeles at \$11,000 including laterals, ducts and necessary fittings.

Cal., Redondo—E. L. Garretson & Son have been awarded the contract for improvement of the Strand, consisting of entire front walk improved with ornamental lighting system, paving of all streets to Hermosa Ave., and placing sidewalks on all cross streets in the district. Contract price, \$76,000.

Cal., Los Angeles—The Chamber of Commerce is making plans for the installation of a lighting system on Main and Sixth Streets, inside the Grand Boulevard—estimated cost \$30,000.

Ore., Coryallis—The business men of this city are considering the installation of a modern, up-to-date street lighting system in the business section of the city.

Wash., Olympia—Bids will be called shortly for construction of a lighting system in the downtown districts. The matter is being handled by the Chamber of Commerce Lighting Committee.

Streets and Sewers

Cal., Watts—This city will construct a complete sewer system according to the plans of Koebig and Koebig, engineers of Los Angeles. At a recent bidding the lowest bid was furnished by Adam Dalmatin covering more than 175,000 lineal feet of sewer mains at a total cost of \$475,000. Bids were taken under advisement by the city trustees.

Cal., Pasadena—The city commissioners will be asked to pave East Colorado St., from Marengo to Mentor Aves. with a 7-in. concrete base and 2-in. oiled macadam wearing surface according to plans now being prepared by city manager C. W. Koiner. Other projects are also being prepared at this time.

Cal., San Diego—According to the preliminary estimates of the city manager's office, more than \$1,000,000 will be required to do the necessary amount of street improvement work during the next twelve months. Some investigations are also being made as to whether the city should construct a paving plant.

Cal., Pomona—This city is starting work on the paving projects authorized by the recent bond issue. More than \$60,000 will be expended on six of the principal streets in the residential districts.

Waterworks

Cal., San Diego—H. M. Savage, city hydraulic engineer, has recommended that the city expend \$3,000,000 immediately in expanding its municipal water system, in a report recently submitted to the city council covering the water question. Development of the water system in San Diego and the purchase of the Cuyamaca water system are recommended.

Cal., Glendora—The Los Angeles Construction Company has been awarded the contract for the construction of the 3,000,000-gallon reinforced cement reservoir, which is to be divided into two compartments by a heavy cement wall. A. H. Sanders has charge of excavation.

Cal., Long Beach—The city is faced with the necessary expenditure of \$1,465,000 for increased facilities for public water supply. Including new reservoirs, mains, wells, paving and replacements this sum of money is urgently needed and the work should be started at once, according to the published statements of the Supt. of Water Dept. Clark H. Shaw. Director of Public Utilities A. C. Ferver is also preparing estimates for substantial additions to the sewer system which are intended to provide ample capacity in outfall mains and screening systems for some time to come.

Wash., Seattle—Detailed plans and specifications for a proposed municipal waterworks system for the town of Monroe are being completed by the Miller Engineering Company, Burke Building, Seattle, and bids for the improvement will be called for by W. H. Clark, town Clerk of Monroe, shortly. The project, which will represent an expenditure approximately of \$480,000, involves the construction of a 1,000,000-gal. concrete reservoir, the laying of six miles of 8 and 10-inch wood stave main pipe line, and 32,500 lineal feet of 4, 6, and 8-in. wood stave distribution lines.

Miscellaneous

Ariz., Tucson—Storage Plant—H. A. Warren, engineer for the Pacific Fruit Express Company is quoted as saying the new ice and cold storage plant to be erected on Southern Pacific

property will provide additional refrigeration capacity of 15,000 tons. It will be electrically driven throughout. Work is to commence in June.

Cal., Los Angeles—Harbor Improvements—The Board of Harbor Commissioners has authorized the construction of a temporary ferry landing on Terminal Island, to cost \$1,500. The board contemplates the erection of permanent buildings at an early date and additional dredging will be done in the turning basin.

Cal., Los Angeles—Harbor Transit Sheds—Bids were received by the harbor commission for steel transit sheds and Pacific Iron and Steel Co. was awarded the contract. This shed is to be erected at Pier 376 within 6 months' time limit, at a price of \$14,950.

Cal., Los Angeles—Ventilating System—Carrier Engineering Corporation of New York was awarded the contract for the extensive ventilating and cooling system for the Hill Street Fireproof Building Company. Three months will be required to install this system which will cost \$108,850 when completed. Edwin Bergstrom is architect.

Cal., San Pedro—Harbor Improvements—More than \$1,600,000 was offered for the 4½ per cent improvement bonds by Drake, Riley and Thomas, of Los Angeles. This money becomes immediately available for further harbor improvements.

Cal., Los Angeles—Theater Wiring—Contract for electrical installation in the Hill St. theater was awarded to Newberry Electric Corporation for the sum of \$59,631 including switchboard and all motor wiring.

Cal., Los Angeles—Sprinkler System—Cohn-Goldwater Company of 12th and San Julian Sts. will equip their loft building with full electric control, automatic sprinkler system. The contract has been awarded to California Automatic Fire Sprinkler Company.

Cal., Los Angeles—Pumping Plant—The Harris Pumping Station has been contracted to W. M. Leadbetter at a price of \$25,856 for all pumps, motors, piping and building ready to operate. Construction will require four months.

Ore., Riddle—Street Lighting and Water System—A bond issue carried at a recent election for the construction of an electric light plant and auxiliary water system.

Utah, Price—Telephone Line—The Midland Telephone Company is preparing to construct a line from Fruita, Colo., to Green River, Utah, according to an application filed with the Utah Public Utilities Commission. J. N. Corbin is president and manager.

Wash., Aberdeen—Logging Camp—Work has started on a construction camp six miles north of Hoquiam, thereby launching operations of the recently organized Greenwood Logging Company, which will bring to market between six and seven hundred million feet of fir, spruce and cedar timber. The holdings of this company comprise one of the finest remaining stands of fir in the Pacific Northwest. Twelve miles of standard gage railroad will be built to the nearest stand of timber from a point on the East Hoquiam river four miles north of Hoquiam. The logs will be taken by rail to the river and then floated down and sold on the open market.

Wash., Seattle—Telephone Lines—The reconstruction by the Pacific Telephone and Telegraph Company on its long-distance line between Seattle and Cle Elum, will cost \$332,000, and provide three new circuits between the two cities. Work will involve the placing of 2,750 poles, 8,200 cross arms, and the stringing of 1,150 miles of copper wire.

Wash., Bremerton—Harbor Improvements—Secretary of the Navy Denby has specified in the recommendation to the Senate Naval Committee a desired increase in the House appropriation bill of \$500,000 for the extension of Pier 4, Puget Sound Navy Yard.



